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# The fittingness of fitness: the movement of architecture at a human scale: a reinvention of the typical workplace

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# The Fittingness of Fitness

**The Movement of Architecture at a Human Scale**  
a reinvention of the typical workplace

emily parris

independent project proposal

december 20, 2006 Professor Derek Bradford



Roger Williams University  
School of Architecture, Art and Historic Preservation  
Independent Thesis Project

**the fittingness of fitness**

the movement of architecture at a human scale

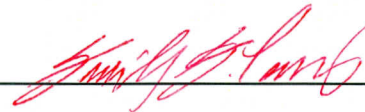
reinvention of the typical work place

financial district Boston, Massachusetts

submitted by:

**Emily Parris**

May 2007



submitted to: Professor **Daniel Hisel**

 12/3/07

Dean of Architecture  
Professor Steven White



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## *the proposal*

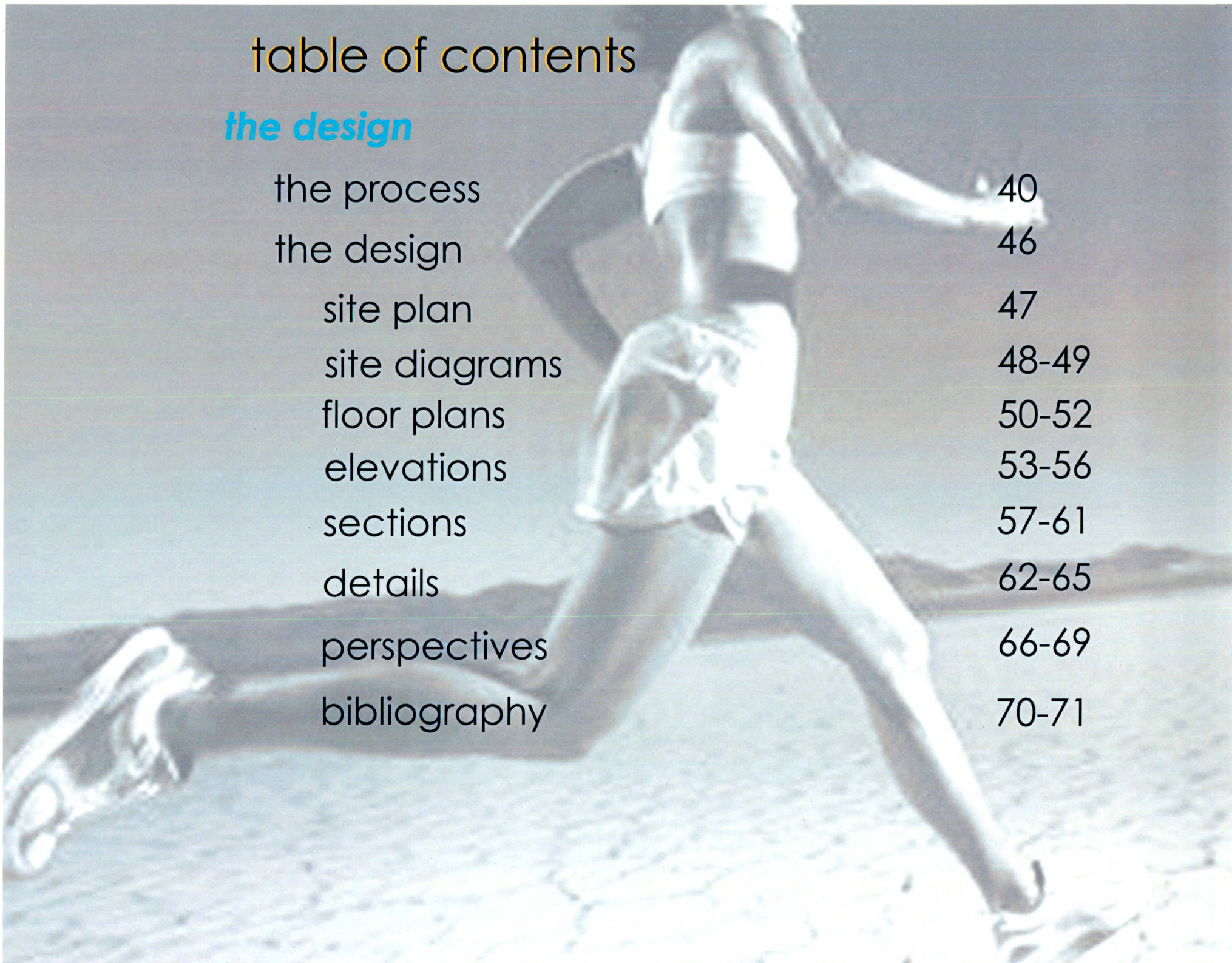
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# abstract





The intent of this proposal is to create a prototypical office building that promotes health and individual well-being. The architecture will focus on the need and concerns of each worker in relation to their physical, emotional and spiritual health. Due to the fast-paced American lifestyle individual health is suffering. The rates of obesity and depression in the United States are skyrocketing and architecture has an obligation to address this urgent issue in terms of design.

In the attempt to redefine the typical American workplace this independent project is a new office for the State of Massachusetts department of Health and Human Services. The client was chosen because it in many ways illustrates a simple “generic” office type hosting typical office functions and needs. This type of office is the most common and would most benefit from redesign.

## Our Architectural bodies

the scale and proportion of the individual

### What is architecture?

Architecture is a metaphorical body. It is built and it functions as a body; a series of dynamic systems built simultaneously to service the physical, mental and spiritual form. The reference by Vitruvius to the body is clear in his explanation of the system of measure:

*"Moreover they (the ancients) deducted standards of measure that all works obviously require from the parts of the human body: finger, palm, foot, cubit."*

In this instance, architectural measurement has taken its inspiration from the form for which it is based. The issue of scale and dimension are properly in tune because they are based on common geometries of the human ideal. Architecture should address the scale and proportion of the individual in this way in order to improve and assist their lives.

Healthy design must address current human needs and changes, and it must speak in an effort to improve the lives of all of its users. Architecture must be responsive to the concept of the ideal human figure as well as the physical potential of that ideal. The role of the architect is to investigate the factors that limit individual potential and through the design of space, empower that individual allowing them to perform. These factors include: form, size, mobility, illness and endurance.



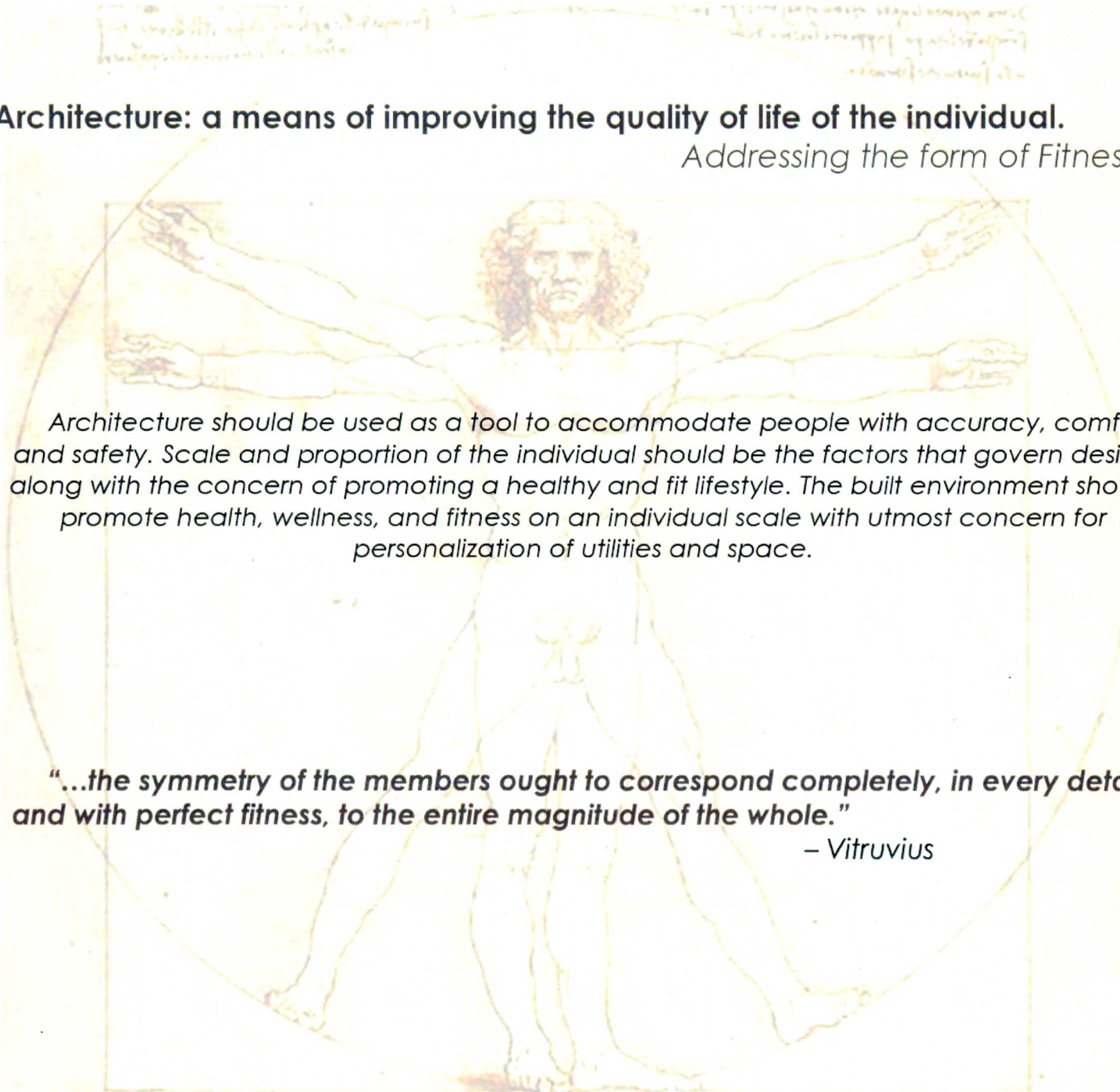
**Architecture: a means of improving the quality of life of the individual.**

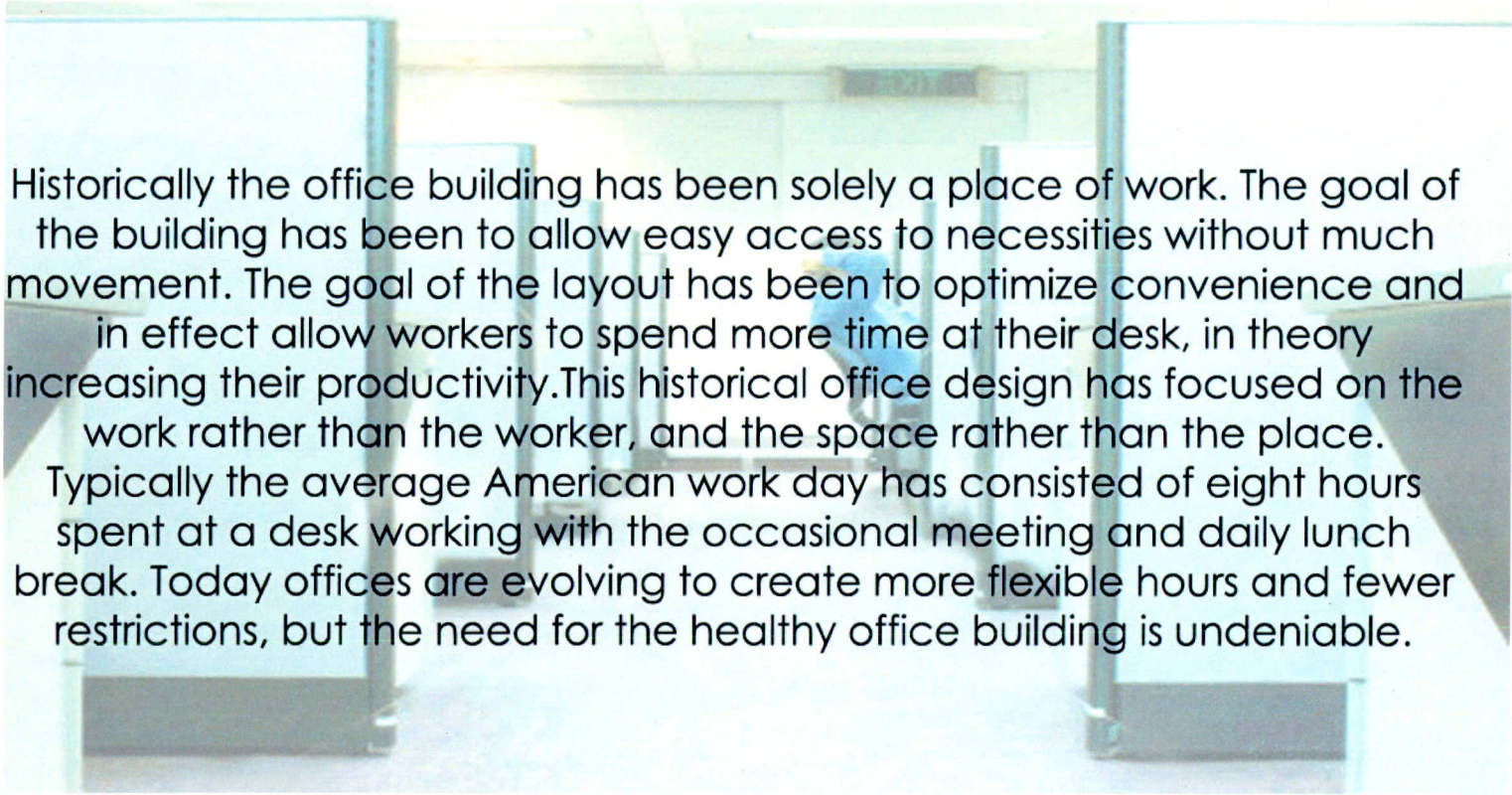
*Addressing the form of Fitness.*

Architecture should be used as a tool to accommodate people with accuracy, comfort and safety. Scale and proportion of the individual should be the factors that govern design along with the concern of promoting a healthy and fit lifestyle. The built environment should promote health, wellness, and fitness on an individual scale with utmost concern for personalization of utilities and space.

**"...the symmetry of the members ought to correspond completely, in every detail and with perfect fitness, to the entire magnitude of the whole."**

– Vitruvius





Historically the office building has been solely a place of work. The goal of the building has been to allow easy access to necessities without much movement. The goal of the layout has been to optimize convenience and in effect allow workers to spend more time at their desk, in theory increasing their productivity. This historical office design has focused on the work rather than the worker, and the space rather than the place. Typically the average American work day has consisted of eight hours spent at a desk working with the occasional meeting and daily lunch break. Today offices are evolving to create more flexible hours and fewer restrictions, but the need for the healthy office building is undeniable.



***"Today in America, for the first time ever, the average life expectancy for a newborn is lower than that of its parent."***

*runners magazine, march 2006*

The percentage of children that are obese has almost doubled in the last 12 years. In a related observation the number of documented cases of heart disease and diabetes has also risen dramatically in the last ten to twelve years.

**Clinical depression is currently the leading cause of disability in North America as well as other countries, and is expected to become the second leading cause of disability worldwide (after heart disease) by the year 2020.**

Today, 64.5% of all adults in America (approximately 127 million) are categorized as being overweight (BMI > 25) or obese (BMI > 30).

Obesity is a disease that affects nearly 33% of all adults in America. it causes at least 300,000 excess deaths in the United States each year, and healthcare costs of adult Americans with obesity amount to well over 100 billion dollars annually.

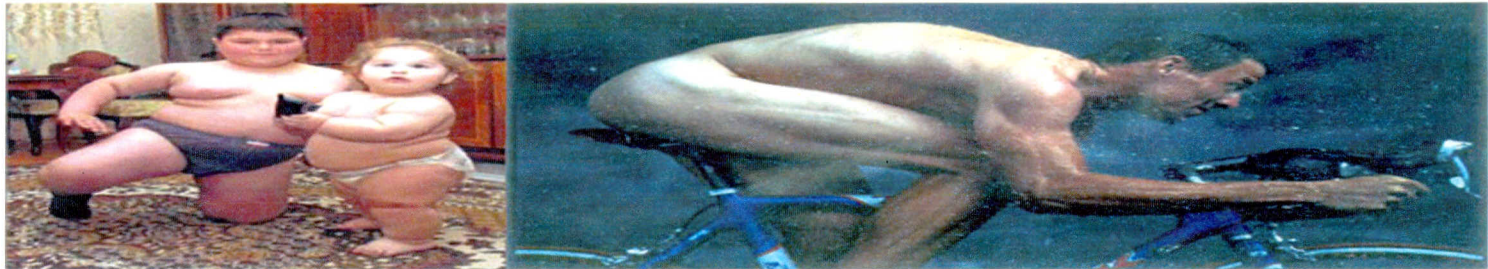
Obesity is the second leading cause of unnecessary deaths, 2nd only to smoking, and greatly increases one's risk of developing conditions such as high blood pressure, diabetes (type 2), heart disease, stroke, gallbladder disease, and cancer of the breast, prostate, and colon.

More than 62% of all women in the United States are overweight.

**Overweight adolescents have a 70% chance of becoming overweight or obese adults;**

-that number increases to 80% if one or more parent is overweight or obese.

(World Health Organization <[www.who.int/en/](http://www.who.int/en/))



In the search for the meaning of architecture one might look back into history and cite the idea of the primitive hut as the reason for architecture. From this historical standpoint architecture becomes nothing more than a basic human need; a survival tool that protects man from the elements. In a different light, one might decide that architecture is a functional means of human expression; an enjoyable, intriguing display of design. In this instance architecture is an artistic release for the maker, and an enjoyable or entertaining experience for the visitor.

In any case, **the motivation behind any architecture is people**, and while an apartment style shelter may serve as protection for hundreds and a private reading room may serve as simple enjoyment for one, the connection between architecture and people is undeniable. With the absence of people there would be no need for architecture.

**So why aren't buildings designed purely for the mental, physical and social health of those who use or encounter them?**

**Architecture must react, respond, and adhere to the physical, mental and social fitness of the individual.**



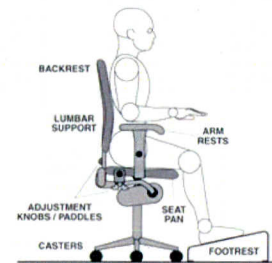
## “the fittingness of fitness”

The term fitness can be functional on two distinct levels. Initially the term refers to an individual's physical health; **of being in good condition**. On a second level the term fitness can reference the **accuracy of scale in relation to a specific body**.

**fit•ness** (f t n s) n.

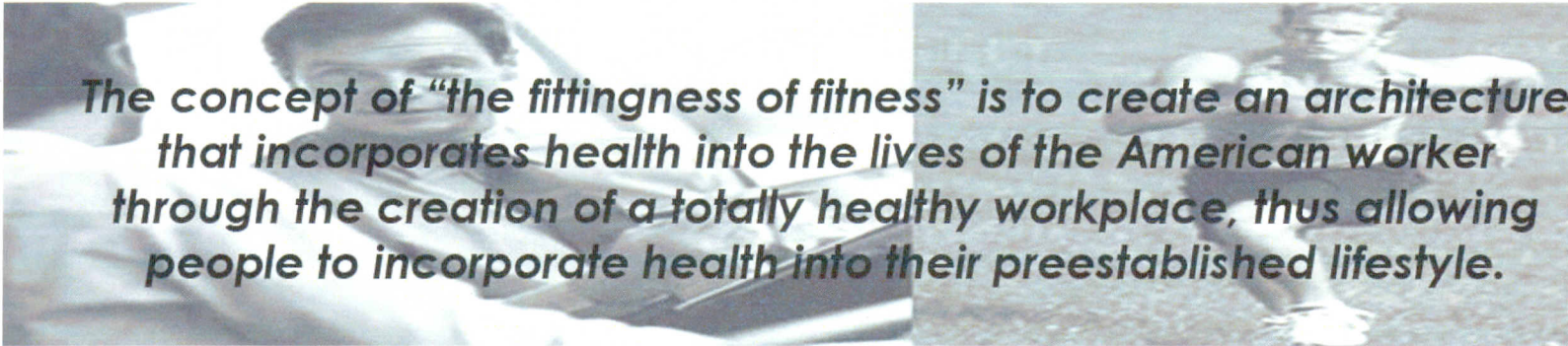
1. The state of being suitably adapted to an environment.
2. The state or condition of being fit; suitability or appropriateness
3. Good health or physical condition, especially as the result of exercise and proper nutrition.

(www.dictionary.com)



Fitness is the goal of architecture, it relates in many ways on both levels. It is how people relate and benefit from architecture. Architecture must fit the individual; buildings are designed by people for people hence the scale should be proportionate and intimate to the user. In the same sense, due to a recent decline in American health, architectural fitness entails an effort to improve the overall health of the user. Design should promote, assist and improve the growth and wellness of the human form on every level.

Architecture is most simply a creation and display of art at an inhabitable scale. The goal of architecture is to benefit people and improve their lives. The architect has a social obligation to the user to enhance and improve the experience of a building through the creation of healthy spaces.



***The concept of “the fittingness of fitness” is to create an architecture that incorporates health into the lives of the American worker through the creation of a totally healthy workplace, thus allowing people to incorporate health into their preestablished lifestyle.***

Human fitness results from movement. The body benefits and prospers from an active lifestyle this lifestyle is slowly becoming extinct through cultural luxuries and conveniences. Society is constantly growing and moving in an effort to make things faster and easier for people; however, at the same time we are taking away the exercise and movement that keeps the human form in high functioning order. Developments such as the automobile, motorboat, elevator, and escalator make our everyday life “easier” while at the same time they rob us of the exercise that historically has been incorporated into our everyday tasks.



## **fitting the movement of form into the form of movement**

### **fitting-in fitness**

In America the pace of life is on a rapid increase. The typical office worker puts in over forty hours a week and is under constant pressure to perform and exceed expectations. These demands are often combined with the balancing of a family and social life, and can often result in a fast paced, high stress life style.

With in our daily activities it is very common to neglect our own, physical and mental health. For many typical Americans there is not enough time to go to a gym or health club, and the lack of attention paid to our own to mental health is result of a fast paced lifestyle. It is for this reason that the workplace must evolve to analyze and redefine the American condition. Through the incorporation of wellness into the workplace by means of a healthy building Architecture can improve the life of the worker on an everyday basis.

Incorporating transport as a means for physical activity into daily routine through walking and cycling is a choice with several positive health effects. The challenge for many people is how a physically active lifestyle can be reintroduced into their lives. The evidence on health effects and personal costs of physical inactivity, as well as on the health benefits of walking and cycling is undeniable and must become incorporated into our everyday experiences.

Through the careful use of color, light and ventilation design can improve not only the physical health of an individual but also their mental health and social wellbeing.

Architecture has an obligation to society to investigate the condition of its users. When architecture is for the benefit of people then it, in fact should address the health and fitness concerns of the individual in an effort to improve the current American situation.

# program

independent project proposal

The program for the typical office building is in many ways the most generic. The layout of the building is designed around efficiency. Being primarily a place of work and production, historically the office building layout has evolved to fit the most usable programmatic space and eliminate both dead space and circulation space.



The office building has in many ways become valuable by its degree of efficiency and lease-able space. The taller the office building, the more floors to be leased and therefore the more profit for the owner.

In this sense, the building programming has become a simple system and a bland puzzle of generic efficiency.

In order for the office building to respond more closely to the health needs of the user the typical office program must become more flexible to include interesting circulation and enjoyable spaces for workers.



## key relationships

Office space to gym space- juxtapose the spaces to create a strong visual connection encouraging people to move in and out between programs

Individual space to group space- test the lines of boundaries allow group spaces to be visible from individual work spaces.

Circulation route to main programmatic spaces- circulation serves to display programs making them visible and available while mimicking the qualities of those programs

## points of interest

Basic healthy office conditions- workspace conditions that are sensitive to issues of light, air, color, views, comfort, and adjustability.

Program placement- the careful boundary where the two different programs interact.

Visual Connection- making each program visible from the other to encourage mixed use and create a non-intimidating atmosphere

Building as a metaphor- allowing the building to speak as a **body** through the **movement** and shape of both the interior and exterior.



## Programmed spaces

**Office Spaces-** the office must house 250 to 300 state employees, each with an individual desk, and access to computer and printing labs as well as meeting and conference rooms. The office program is basic and in many ways very typical for most American offices, thus making it a good example to illustrate how this concept can become a precedent building type.

Capacity for 350 employees.

350 cubicle spaces at approximately 15'x15'

15 computer labs (1 per floor) each containing a print center approximately 800sf ea.

15 meeting rooms at approximately 400sf each

3 large lecture hall/ meeting spaces approximately 800 sf each

Various open library reference spaces throughout workspaces-unconfined

3 employees kitchen spaces 400 sf ea.

Ground level public cafe 1500sf

Restrooms, Storage, Mechanical spaces as needed

Circulation in this project arguably has a larger role than any other program. The circulation is designed to be a journey rewarding employees in terms of health. It is a feature that evolves throughout the building to become more than a way from point A to point B it is a dynamic sloping and enjoyable journey through spaces.

Through circulation employees are able to experience both programs at once. One can exercise while performing their daily activities within the office and also see what else is available.

Pure circulation accounts for approximately 18% of the building program.

## Programmed spaces

**Gym Spaces-** the gym is a function closely woven within the context of the office place. Many of its spaces are open to the public as a way to advertise the building type and also give back to the community. Employees may use all gym program free of charge while outsiders pay club fees which help compensate for less leasable office space within the program.

### List of Gym Program

Basketball court- 94'x50'

3 Squash Courts- 32'x 18'6" ea.

3 raquetball Courts- 20'x 40' ea.

6 lane track (each lane 46") arbitrary in shape

4 lane 50m pool -600sf total shape

2 Climbling walls -one 24' in height one 48' in height both arbitrary total mass

6 weight rooms- 400sf-1500sf. ea.

6 Studio rooms used for-dance, yoga, spinning, martial arts, etc- 400sf-900sf ea.

Locker spaces- 200sf- 1000sf as appropriate

## Building areas

Each of the thirteen floors has the area of approximately 16,655 square feet the so the total building area is 216,515 square feet.

51% office function

31% gym function

18% circulation

## Spatial Definition

In order to create a healthy work environment the spaces must be enjoyable and must be visually linked to evoke movement. The issues of light and air must be taken in to careful consideration. Work spaces must have a direct connection to the exterior through either placement or the use of skylights.

**The traditional cubicle must be redefined to allow for a more desirable work space. Representing the individual, the cubicle can be seen as a unit of design and a module to base the entire building upon.**

*A building based on the comfort, health and improvement of the individual must examine the relationship between the individual and the group, and therefore the cubical must examine the relationship between the work unit and the entire building.*

The circulation spaces will also take a primary role in design. The process of movement is a healthy and necessary part of a enjoyable and productive life, and therefore this circulation must be embraced.



## key spatial analysis

### circulation

The office building will be broken down to include an extensive circulation system this will illustrate the idea of health through movement. The spaces will be laid out in sequence with emphasis on interesting visual relationships between programmatic elements. Visual connections and enjoyable travel will help to encourage people to move through out the workday while being visually connected to alternate programmatic functions.

### health facility

The healthy office will contain within it a health facility. In many instances people don't have the time to go from work to the gym after work, so by making fitness equipment convenient and available it will encourage people to use it. Along with the fitness center will be a health office offering health services and providing information.

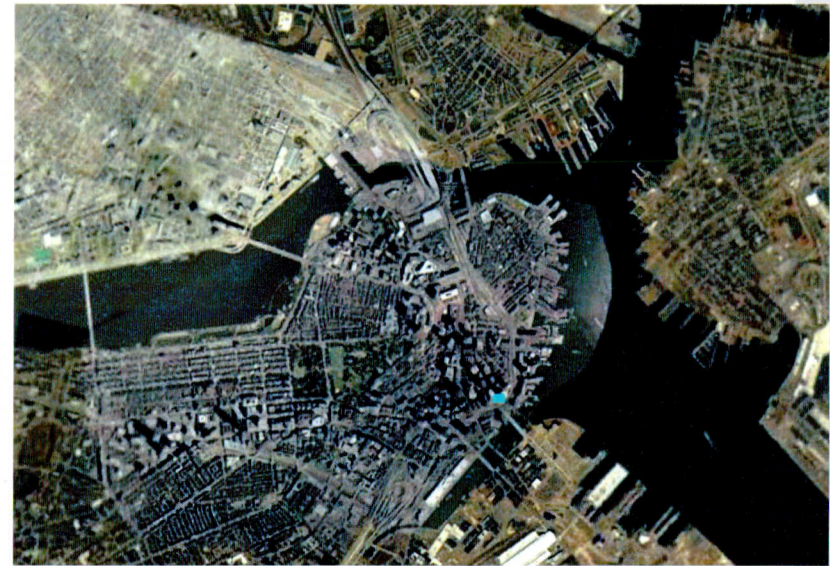
### greenway presence; metaphoric shape and character

The building must have a relationship with the public, being a prototype it will attract many interested visitors and must have a sincere connection to the site, the building must move as the body moves and it must respond to movement in the same way. The building must respond to the movement of the greenway and the gesture of the city towards a healthier environment.

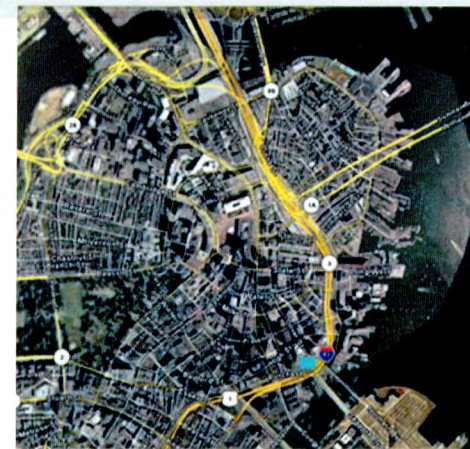
# site analysis



Site Location: Boston, Massachusetts

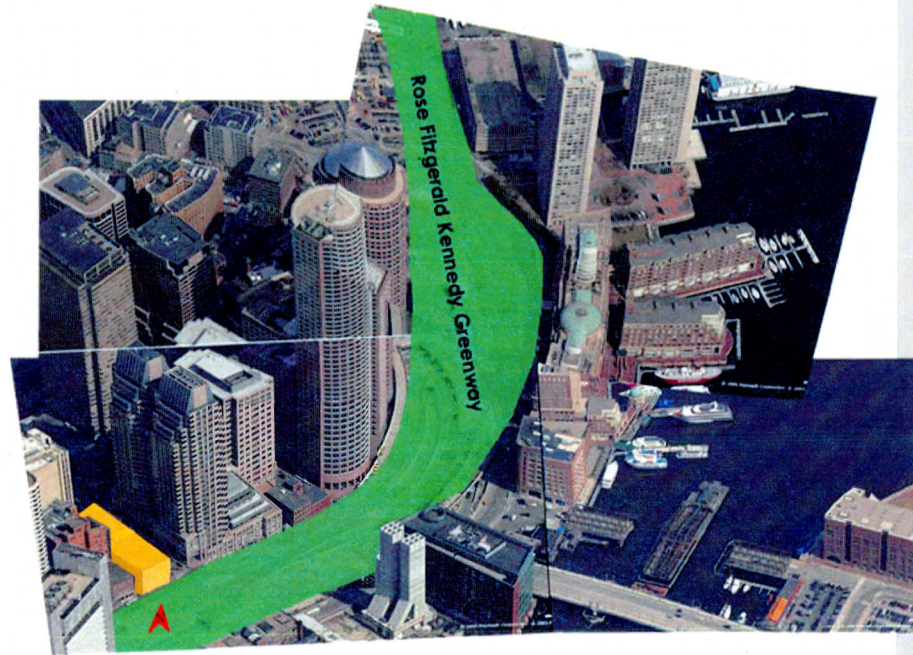
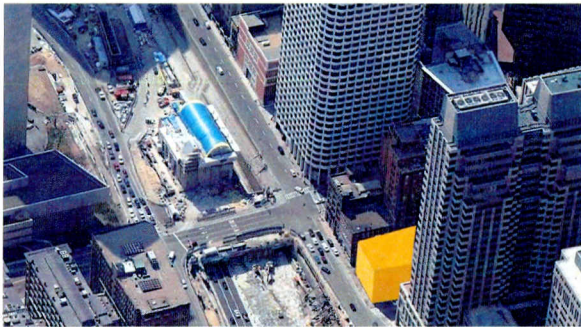


*the city moves as the individual moves; by growing through advances of the body*





The site is located at the corner of Pearl Street and Surface Road, in Boston, Massachusetts. The lot abuts the east side of Parcel 18 of the developing Rose Fitzgerald Kennedy Greenway.



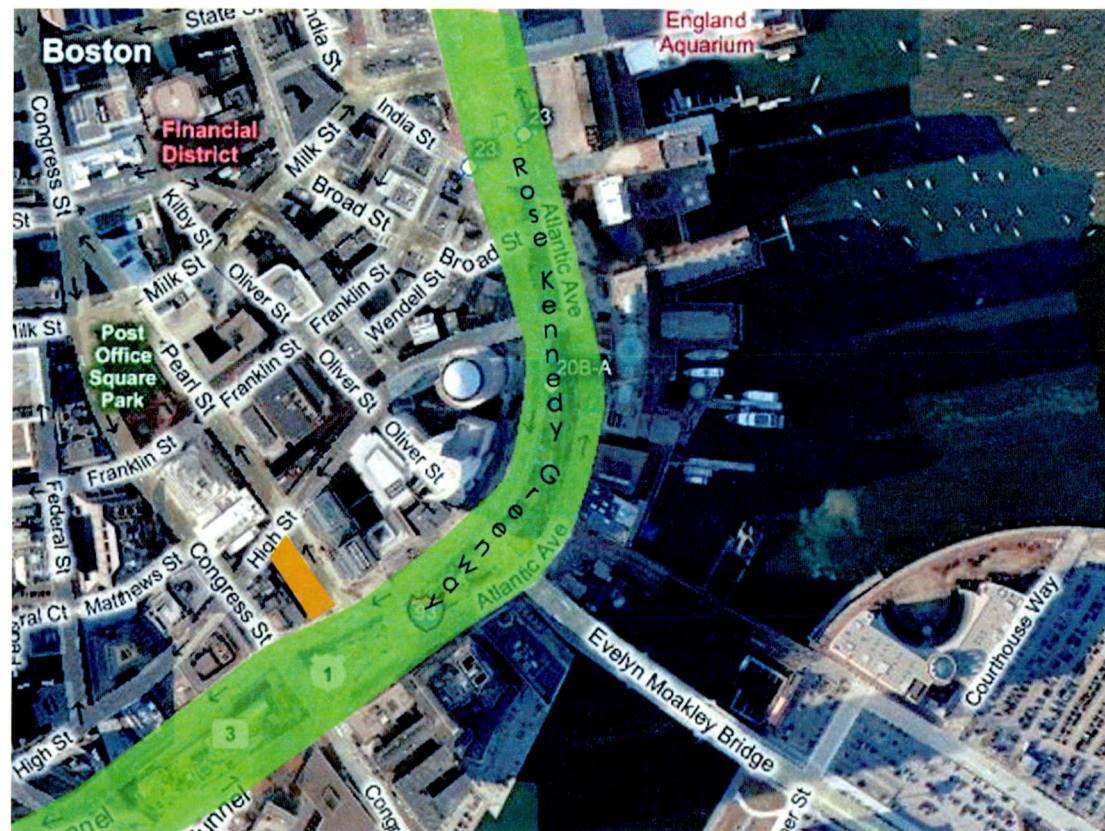
The site is experiencing an abundance of new growth and development. The focus of this development is to create pedestrian friendly public spaces that will reveal and celebrate the culture of Boston.

With prime views of not only the parkway but also the Boston Harbor the lot for the healthy office is in prime location to fully benefit from this development. By placing the active office within an actively growing site people will be more likely to fully utilize the site by means of walking, exploring and simply going outside.



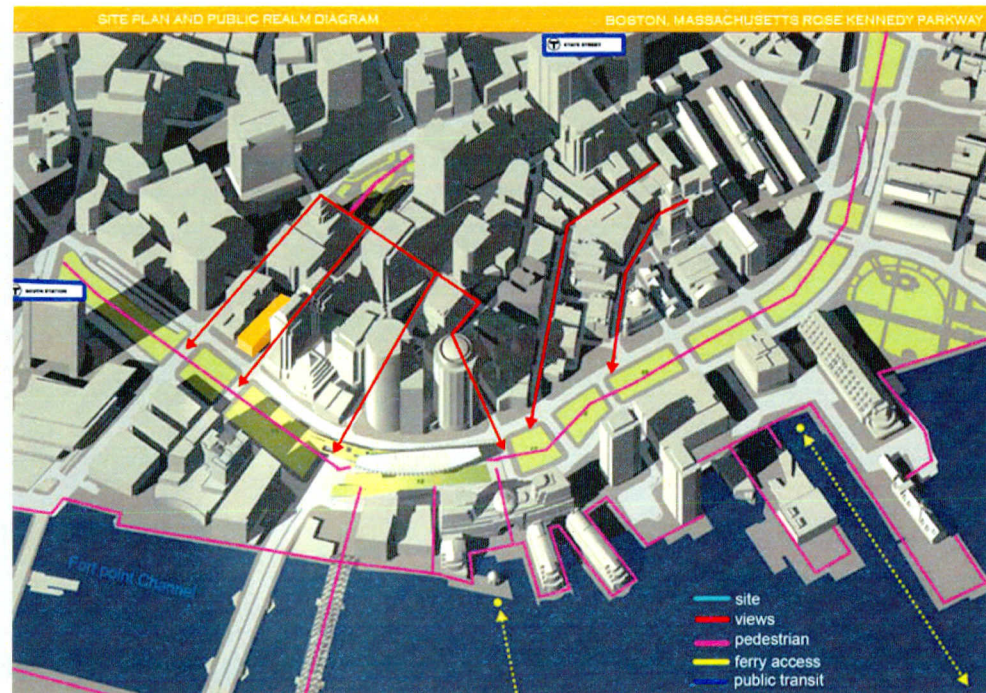
In many ways, the program is a prototype for the typical office building housing the typical client. By addressing the most common type of office building, architecture can then influence the most typical American office worker. The most beneficial site for this type of program then would be in a well populated working urban district. This location will help to promote the idea of the healthy office; the goal being the spread of this idea.

This area of Boston (Financial District) is home to many offices and tall office buildings and it draws many people here everyday for work. This influx of people along with the new growth in the area make the site a prime spot for tourism, leisure and conferences; thus attracting a variety of audiences.





In order to create the most healthiest of buildings the site becomes crucial in terms of accessibility. The city of Boston has a well established public transit system which is currently undergoing growth and improvement. The site is not only pedestrian friendly but is also accessible by ferry, bus, and subway. The lack of parking and vehicular restrictions in the area encourage people to carpool or use public transportation rather than drive personal vehicles; this in effect not only cuts down on pollution to create a healthier atmosphere but it also forces people to exercise via walking or biking.



The Central Artery/Tunnel Project is the largest and most complex highway and tunnel project in nation's history. One of the main goals of this project was to move vehicular traffic underground to allow for above ground parks and development. The bulk of vehicular traffic has now been removed from the area eliminating congestion. The area does still have some vehicular access in order to allow for service and emergency vehicles.



The site is nestled within the existing urban fabric of the Financial District zoned Boston Proper. The building is bound on two sides by neighboring buildings and will also have to deal with shadows cast by other larger neighbors.

Natural site conditions include:

Strong wind conditions from the southeast off of the Boston Harbor

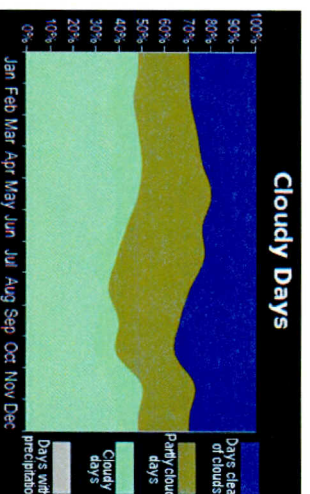
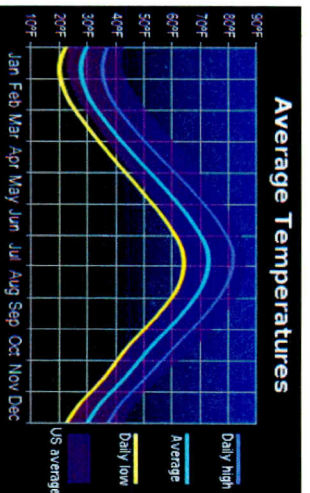
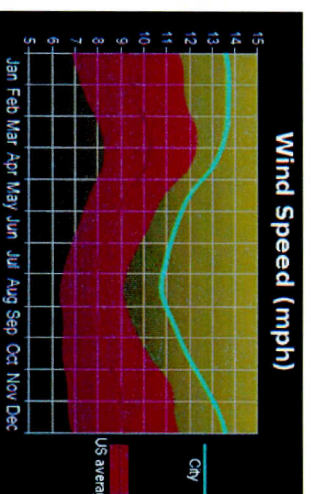
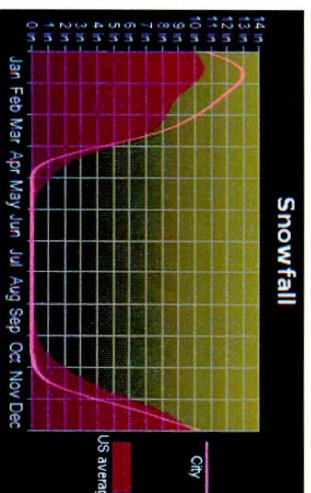
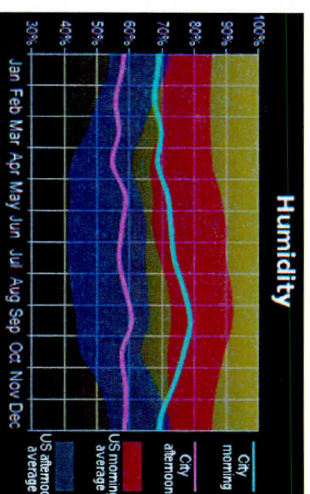
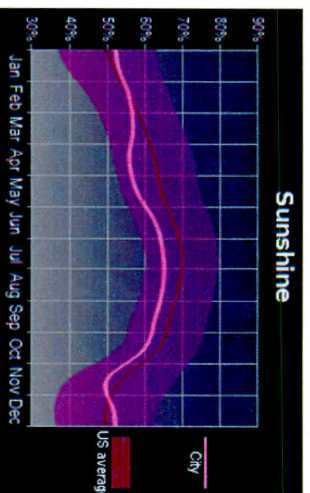
Direct morning sunlight from the east

Harsh cold winters

Possible flood warning in extreme weather circumstances



# Boston Climate





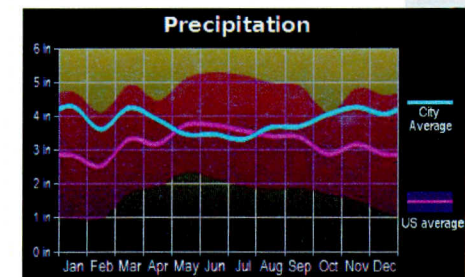
Article Published on Tuesday, February 15, 2005 by the Boston Globe  
 "Study Predicts City Flood Threat Due to Warming" -Susan Milligan

WASHINGTON - By the end of this century, global warming threatens to raise the sea level enough that a heavy storm would send flood waters into Boston's downtown waterfront, the Financial District, and much of the Back Bay, based on projections in a federally funded report to be released today. The five-year study, commissioned by the US Environmental Protection Agency and completed by university researchers, indicates that the mildest impact of global warming would leave local landmarks such as Massachusetts General Hospital, the Public Garden, the Esplanade, and MIT in a pool of water after a strong storm surge in the harbor. Global warming, which melts polar ice and has been gradually raising the atmospheric temperature, could actually cause the sea level in the Boston area to rise as much as 3 feet in the next 100 years, the researchers predict.

The report is the first heavily detailed, EPA-sanctioned study of the effects of global warming on a metropolitan area. Scientists believe gases from fossil fuels used to generate energy are heating the atmosphere, a trend that would lead to higher air temperatures and water levels. Those effects would in turn cause a variety of threats to humans, such as more air pollution and higher mortality from heat stroke, the report said. Commerce would also be affected because trucks would not be able to move as quickly during heavy flooding, the report said.

According to the report, the sea level could rise by about 2 to 3 feet during the coming century, increasing the likelihood of flooding during a storm. One exception to the projected damage is the Big Dig, said William Anderson, a Boston University geography professor who worked on the study. "The Big Dig is probably the last piece of infrastructure you should worry about because it has the best design tolerance, in terms of storm" threats, Anderson said.

Nonetheless, a computerized projection of flooding shows water covering the surface of the Interstate 93 tunnel downtown. The surge from a "100-year storm," an unusually heavy rainstorm, would also send water into the Back Bay, from Storrow Drive to Commonwealth Avenue. That flooding would occur because seawater would be pushed over the top of the Charles River Dam.



current precipitation Boston, MA



Site analysis



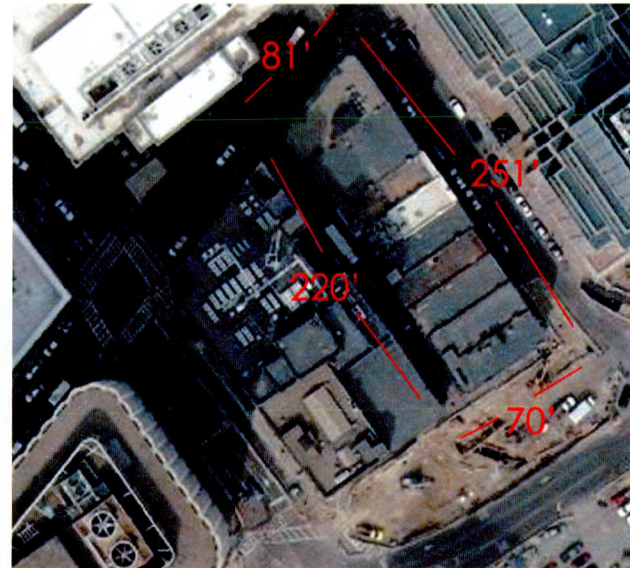
image dimensions and text

## Existing Site and Building Dimensions

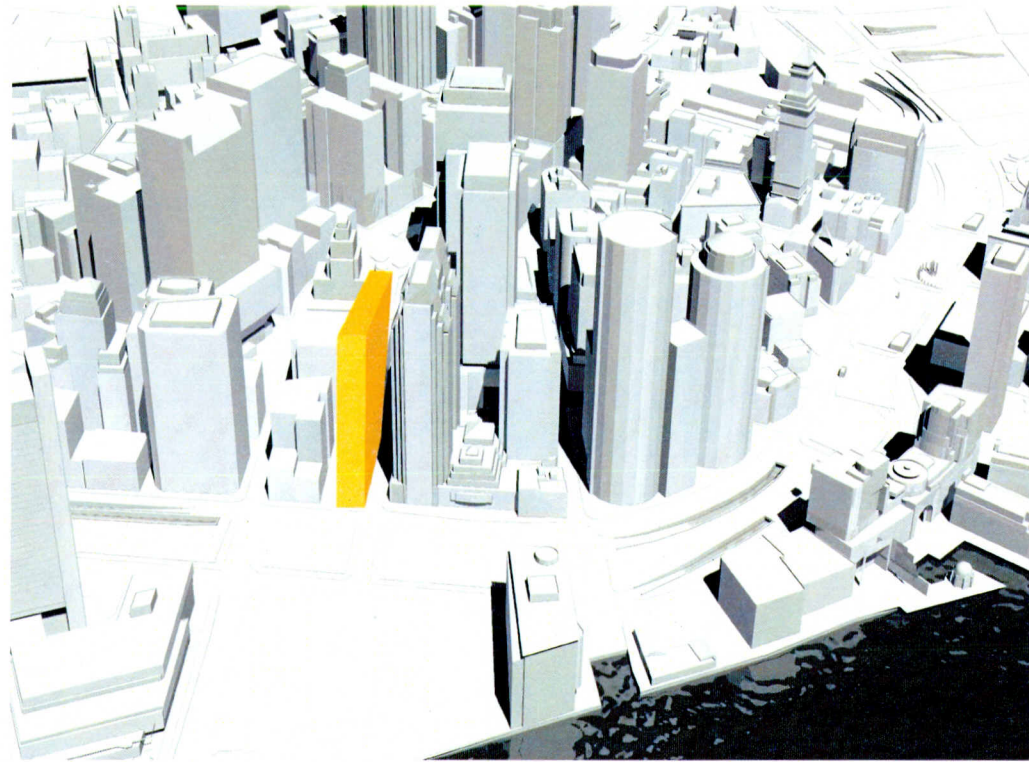
Currently 141 Pearl Street is occupied by a multi-use building with a footprint of approximately 16,650 sq ft.

The property line if the site is fully utilized and there are no setback requirements.

The official FAR (floor to area ratio) is 8:1 making the largest possible amount of programmatic space 133,200 sf







Currently the building that occupies the site is a four storey office building, housing the Center for Inner Boston Harbor Coastal and Tidal Research. This building does not fully utilize its location, and is in many ways a missed opportunity. By replacing this building with one that is much taller the office building will be more valuable in terms of leasable space. A larger office will also take advantage of this ideal corner lot optimizing views and contributing to the aesthetic of the new greenway.

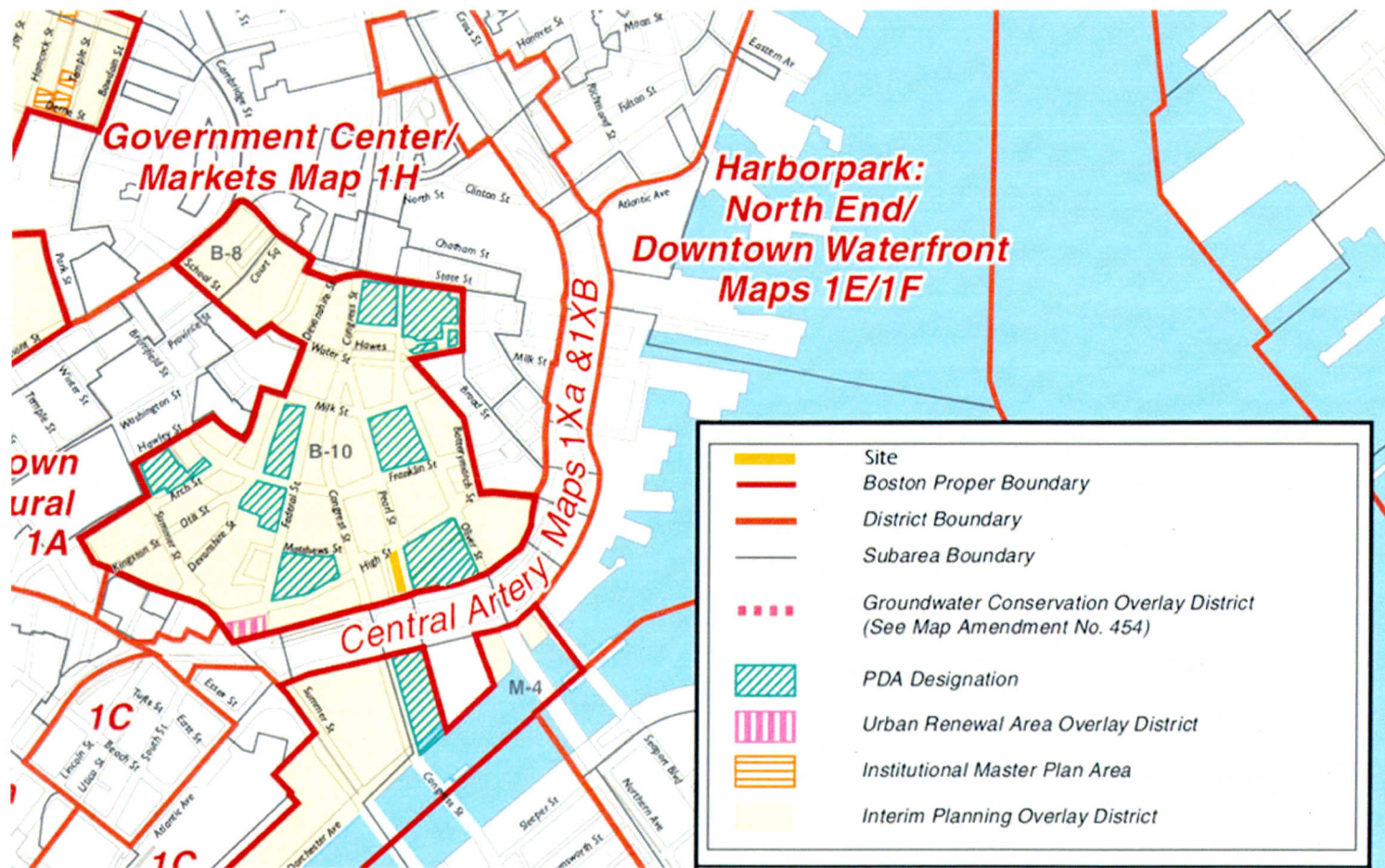
# regulatory environment summary report



## Regulatory Environment Summary Report

### Location

The site for the new State office is in Boston, Massachusetts in the downtown district bordered by the Charles River and Boston Harbor, off of the Central Artery. The site is within the Boston Proper zone. The footprint is located on Surface Road and defined by Pearl Street, High Street and Gridley Street.

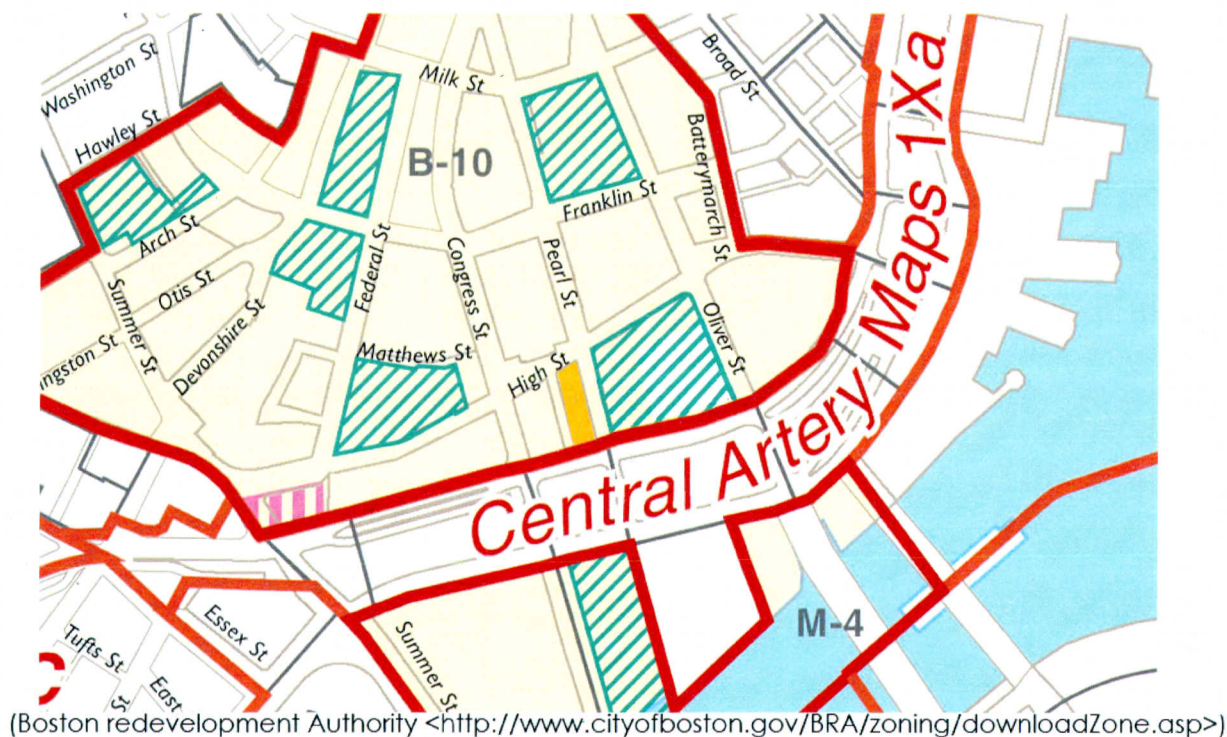


(Boston redevelopment Authority <<http://www.cityofboston.gov/BRA/zoning/downloadZone.asp>>)



### General Code

The Boston Proper zone falls under Boston General Code section M-8 and is not subject to any other specific zoning code document or overlay. Within the scope of the project and site is the development of the Rose Kennedy Greenway. A movement combined with the Big Dig which will ease the traffic congestion of the old Central Artery, and reconnect the North End and the Waterfront neighborhoods of the downtown. The Central Artery/Tunnel Project opened the area to allow for a green parks movement.



### Future Plans

The Site located at 141 Pearl Street Boston, Massachusetts is specified as a planned development area (PDA designation). The future of the site is open to proposals and/ or convincing requests. The zoning laws for this site can be altered or modified in order to better serve the community. There is currently no request for proposal.

## Dimensional Regulations

The general zoning Dimensional Regulations for Boston Proper zone M-8 states that the height of proposed building (other than dwelling) has no restriction.

**^TABLE B: DIMENSIONAL REGULATIONS**

NOTE: Figures in parentheses refer to footnotes below table.

If a district with a second numerical suffix (e.g., H-2-55) is not listed in this Table, see footnote (15) and Section 3-1A(i).

DISTRICT	TYPE OF USE	LOT SIZE minimum sq.ft.	LOT AREA minimum sq.ft. for each add'l dwell. unit	LOT WIDTH minimum feet	FLOOR AREA RATIO maximum  (1)	HEIGHT OF BUILDINGS  maximum stories    feet		USABLE OPEN SPACE minimum sq.ft. per dwell. unit	FRONT YARD minimum depth feet (14)	SIDE YARD minimum width feet	REAR YARD minimum depth feet
M-8	Any dwelling	(3)	(3)	(3)	8.0	none	none	(3)	(3)	(3)	(3)
	Other use	none	none	none	8.0	none	none	none	none	(5)	12

(Boston Redevelopment Authority <<http://www.cityofboston.gov/BRA/zoning/downloadZone.asp#volume1>>)

The lot size, lot area, and lot width within Boston Proper are not restricted other than to the ownership of the land.

The floor area ratio (FAR) in district M-8 is 8.0, and so the maximum allowable height if the building occupies the entire site as designated by general code is eight stories. This height can be altered depending on the building footprint and also contested with reference to new area planning.



## Setbacks

The Inner City Office is located just off of parcel 18 of the new Kennedy Greenway; the general code states that there are no front yard requirements for the site. The proposed building must recognize the public green space that it abuts. Although there is not a specified front yard requirement within the lot, the building must align itself with the pre-existing buildings on the same block.

### ARTICLE 21

#### SETBACKS

SECTION 21-1. **Setback Requirements.** Except as otherwise provided in this Article, where a minimum setback of parapet from lot line is specified in this code, neither the top line of the face of any wall of a structure within the district, and devoted to the use, specified, nor any cornice, eaves, parapet or other feature topping or overhanging such wall shall be closer to any lot line to which it is parallel or most nearly parallel than the distance specified in said Table B or, if such lot line abuts on a public open space or on one of two or more contiguous public open spaces, such distance minus whichever of the following is the lesser: (1) one half of the width of such open space or spaces, or (2) fifty feet.

- ;(a) No setback is required in any event below whichever of the following is the lower: (1) the combined height of the first and any second story above the grade from which the height of the building is measured, or (2) twenty-five feet.
- ;(b) Subject to the provisions of Section 19-6, no setback from side lot lines or from side street lines of corner lots is required:

Below a Height of	Where Maximum Floor Area Ratio Specified in Table B is:
90 ft.	5.0
90 ft.+	6.0
110 ft.+	8.0
120 ft.	10.0

## Parking Requirements

SECTION 23-4. **Retail and Office Uses.** Except in a restricted parking district, no structure or land shall be used for any use listed in Table A of Section 8-7 under Use Item Nos. 32, 33, 34, 34A, 35, 36, 39, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 61, 73, 74 or 78 unless off-street parking facilities are provided as follows:

If the Maximum Floor Area Ratio Specified in Table B of Section 13-1 for the Lot is:		One Space Shall be Provided:		
		for Each:	and also for Each:	
0.3 or 0.5	300	square	600	square
0.8 or 1.0	350	feet of	700	feet of
2.0	500	gross floor	1,000	other
3.0	900	area on	1,800	gross
4.0	1,200	ground	2,400	floor
5.0	1,200	floor	2,400	area*

\* Where main use on a lot is an open-air use not enclosed in a structure, the area of the part of the lot actually devoted to such use shall constitute floor area.

(Boston redevelopment Authority <<http://www.cityofboston.gov/BRA/zoning/downloadZone.asp>>)

If the entire footprint of the site is occupied, approximately 64 spaces shall be provided. The presence of accessible public transportation and the emphasis on pedestrian movement in the area may allow for the petition of this requirement in regard to eliminating or reducing the amount of vehicular traffic. The addition of a parking deck off of parcel 17 may also reduce the need for additional parking.



# precedents

## 30 St. Mary Axe- Foster and Partners- London

This office building is an excellent example of a healthy office. Foster and Partners has made an excellent attempt at recreating the office building with an effort to benefit the user. The excellent use of natural light and fresh air helps to create a healthy atmosphere with the emphasis on individual comfort.

The round floor plan helps to take full advantage of the available light and air, it also creates new exciting and enjoyable spaces.

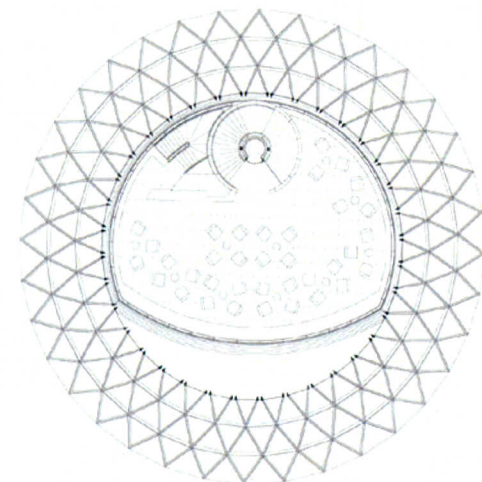
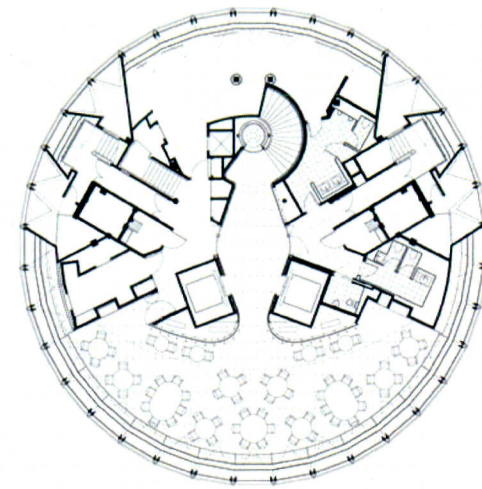




## 30 St. Mary Axe- Foster and Partners- London

### architectural documentation drawings

The primary occupant of the building is Swiss Re, a global insurance company, who had the building commissioned as the head office for their UK operation. On the 40th floor, which is the building's top level, is a bar for tenants and their guests featuring a 360 degree view of London. An exclusive restaurant operates on the 39th floor, and private dining rooms on the 38th.



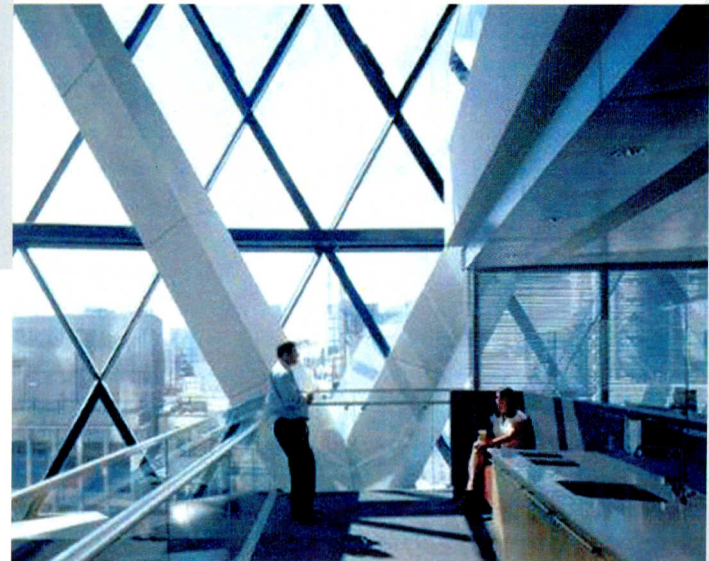
(drawings from <[www.ajplus.co.uk/b\\_bank/search\\_results\\_detail](http://www.ajplus.co.uk/b_bank/search_results_detail)>)



## 30 St. Mary Axe- Foster and Partners- London

The architectural design of the tower contrasts sharply against more traditional buildings in London. Most tall buildings get their lateral stability from either a core column or by an unbraced perimeter tube without diagonals, however, Swiss Re's fully triangulated perimeter structure makes the building sufficiently stiff without any extra reinforcements.

Due to the round shape and glass facade, the workspaces on the interior are filled with natural light creating a pleasant, and productive atmosphere.





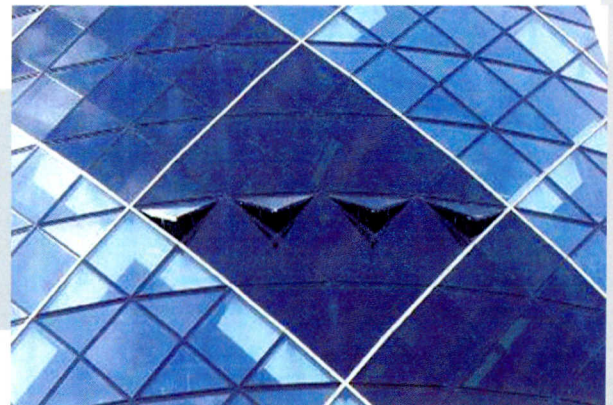
## 30 St. Mary Axe- Foster and Partners- London

The architects, Foster and Partners, crafted a distinctive cone-like shape to reduce the wind turbulence around the tower. Along with this, the building uses energy-saving methods which allow it to use half the power a similar tower would typically consume.

Gaps in each floor create six shafts that serve as a natural ventilation system for the entire building. The shafts create a giant double glazing effect; air is trapped between two layers of glazing and insulates the office space inside.

These shafts pull warm air out of the building during the summer and also warm the building in the winter using passive solar heating. These open spaces also allow sunlight to pass through the building, making the work environment more pleasing, and keeping the lighting costs down.

The unique skin of St. Mary Axe allows for fully operable windows throughout the building. The HVAC systems are carefully built to accept and respond to the individually controlled, free-flow of air allowing people to have control over their work environment.





## RWE Tower- Ingenhoven, Overdieck, Kahlen & Partner- Essen, Germany

This RWE office building is a healthy office focused on user comfort and ecological responsibility. The abundance of natural light and free-flowing air makes this an enjoyable workplace.

The curved shape of the RWE tower allows for excellent office views and the structure allows for large flexible interior spaces.

Along with well landscaped exterior spaces, interior garden floors make for a pleasant pedestrian environment that encourages people to walk rather than drive.





## RWE Tower- Ingenhoven, Overdieck, Kahlen & Partner- Essen, Germany

The concept of this architecture was to build an ecological high-rise. The remarkable point is not only the rise in energy efficiency, but also the concern with the surrounding environment. Around the building, there is a 1,800sqm pool and a green zone. By creating this pleasant pedestrian experience, Ingenhoven, Overdieck, Kahlen and Partner have encouraged people to walk rather than take personal vehicles.



The site of the RWE tower related closely to 70 Atlantic Avenue in the way that it fits with the urban context, and relates to green space. The Kennedy Greenway is a recent expansion in the interest of public pedestrian friendly green space. The RWE Tower demonstrates a successful way of connecting office space to environmental green space.

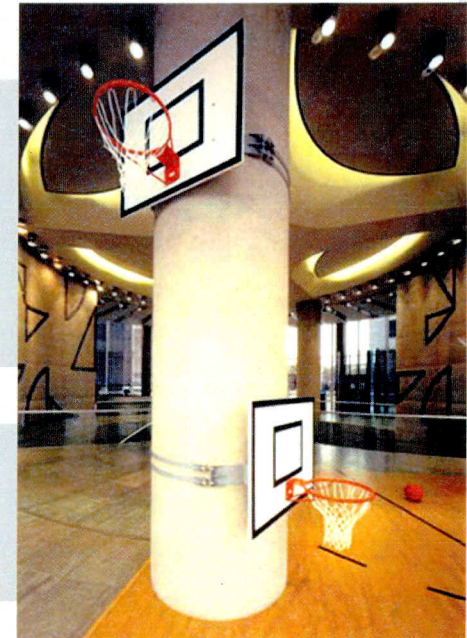




## RWE Tower- Ingenhoven, Overdieck, Kahlen & Partner- Essen, Germany

The tower consists of 29 stories, including a plant hall, 3 basements and the 127m elevator core, plus the 35m aerial. The first basement contains a conference suite, staff restaurant, cafeteria, and recreation rooms. Due to the large structural columns, the ground floor has ample open space for flexible use.

The 2nd-18th and 20-24th floors are occupied by office rooms, which are laid out along the circular corridor around the service core in the center. The plant hall on the 19th floor is twice as tall as a standard story.



The 25-28th floors are for the senior management and conference rooms, which are arranged on the periphery, and they are vertically joined by a glass staircase in the center. The topmost, 29th, floor has a boardroom as well as an aerial garden.





## Bloomberg Europe Headquarters- Powell-Tuck Associates - London

**Bloomberg is an English Global News and Media Company. The headquarteroffice is an artistic and exciting development in office design that combines color light and circulation to create a dynamic atmosphere for employees and guests.**

"Large offices can be draughty spaces to fill, and often alienating for employees. The reception area, which dictates all-important first impressions, is not usually a space to idle unless you're a visitor waiting to be seen. And shared public spaces can be little more than a pokey kitchen with a dirty microwave."

—Bloomberg director of real estate Paul Darrah.

"Bloomberg's shared spaces stimulate creativity, we try to increase communication between employees who may not otherwise mingle; those from different departments or at different chains of command. It makes employees feel a part of things."

— Paul Darrah



## Bloomberg Europe Headquarters- Powell-Tuck Associates - London

On the interior spaces are activated by the movement of people. Spaces are illuminated by the presence of people and all spaces are not only linked through innovative circulation but also visually.

In an effort to increase exercise and movement within the workplace the issue of visual linkage is a simple way to make walking more exciting and therefore more appealing to people, thus encouraging them to physically engage in the workplace more frequently.



**"Playing to and playing off of that which surrounds it, an organism behaves as a person and in the process forms now this , now that momentary architectural body."**

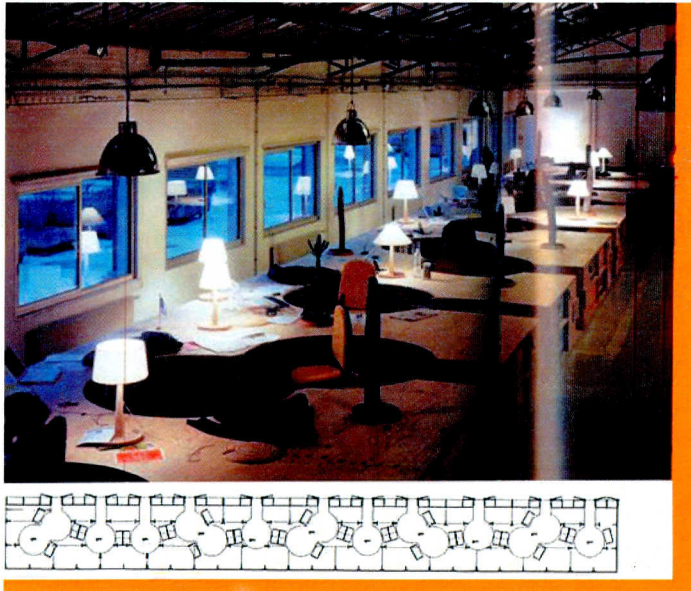
Gins and Arakawa Architectural Body



## KBP West- Jensen & Macy Architects- San Francisco ,CA

The KBP West film and theater studio uses colorful and innovative furniture to create a healthy and enjoyable environment for workers to create and produce.

Fitness and health include more than physical wellbeing. A completely healthy body is mentally and emotionally well. Architectural choices such as color and space sizes have a heavy influence on health concerns such as mood, attitude, and social involvement. Furniture is one tool that can be used in an effort to improve inter-office relationships and evoke a sense of community within the workplace.









# The Fittingness of Fitness

**The Movement of Architecture at a Human Scale**  
a reinvention of the typical workplace

**The Design**

emily parris

Independent project

May 5, 2007 Professor Daniel Hise

*"Traditionally architecture does not move, but it can be designed to embrace the movement of the observer,"*

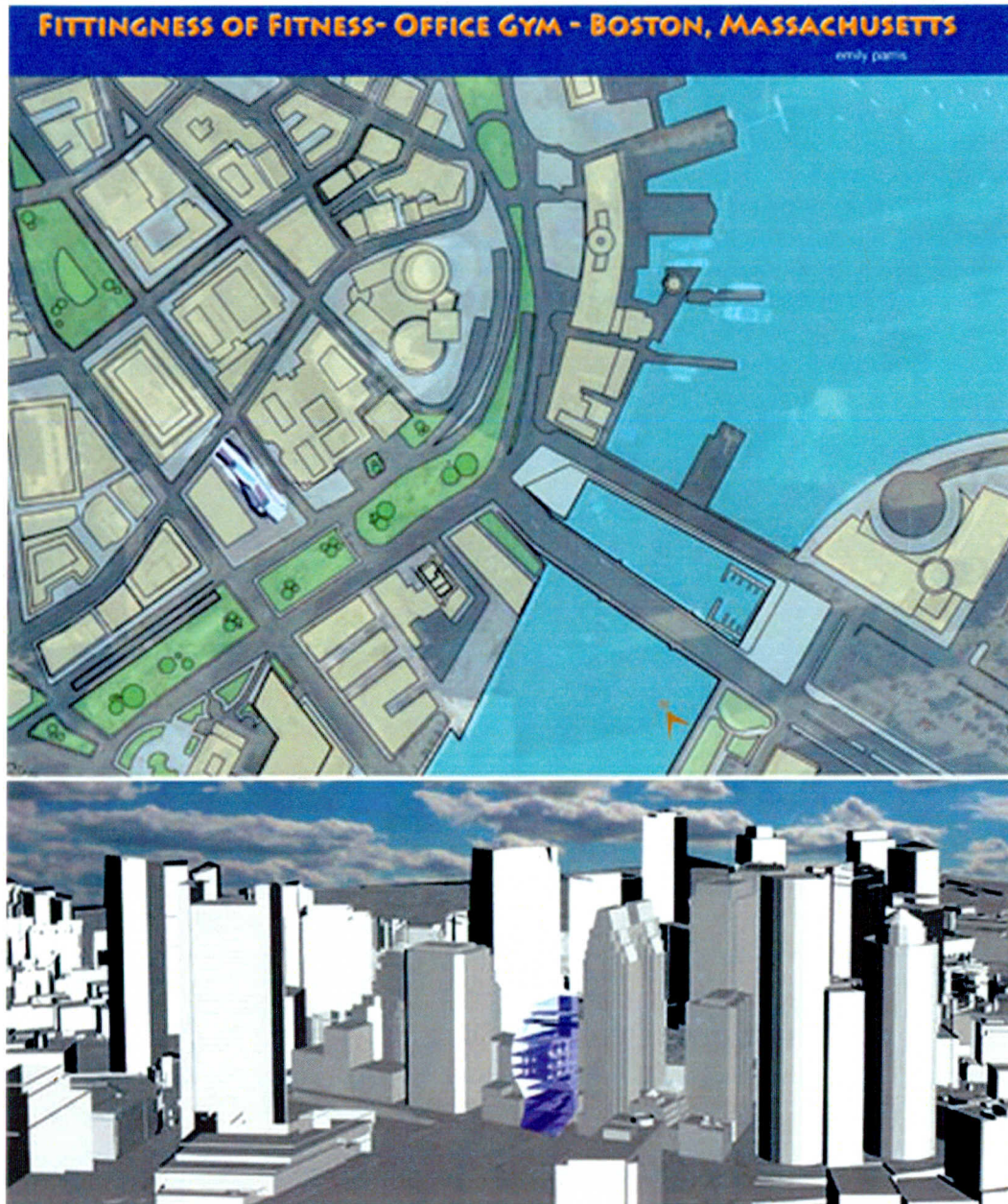
*—jules moloney*









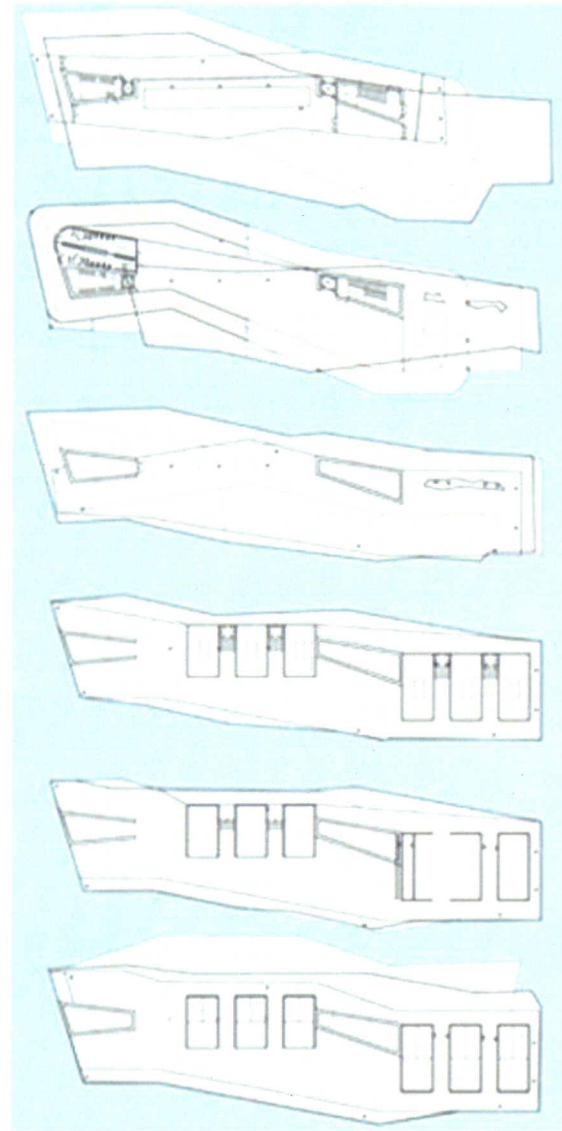
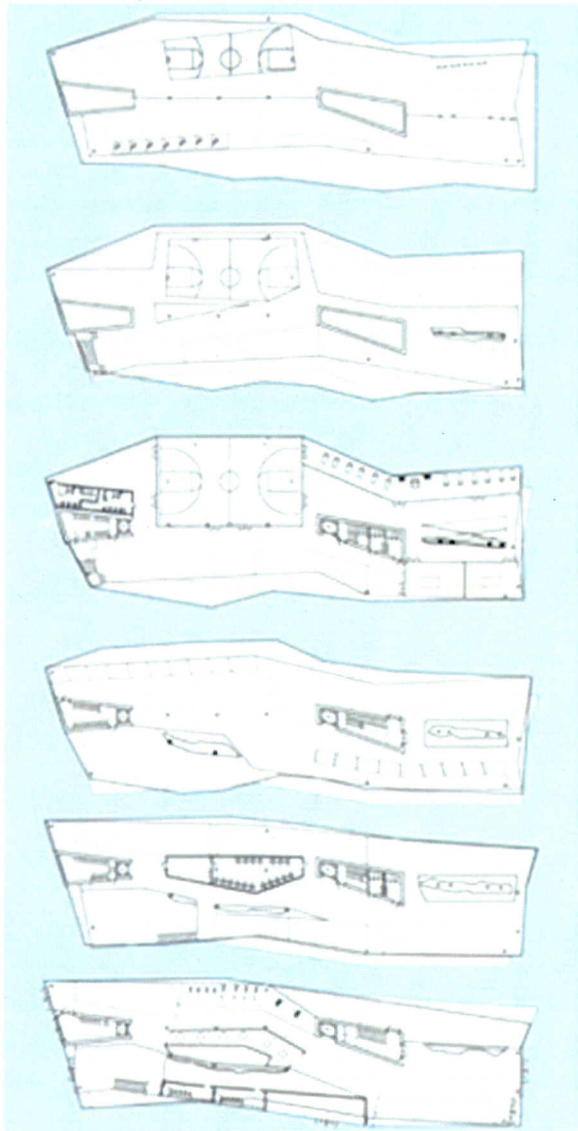


The mergence of architectural program is designed to improve the health of the individual while at the same time add a sculptural presence to the new developing greenway. Through the combination of office and fitness program the goal of the office-gym in Boston Massachusetts is to incorporate movement into the everyday routine of the average office worker. The program juxtaposes office space with exercise spaces in a 60% to 40% ratio while establishing strong spatial and visual connection between the two programs.

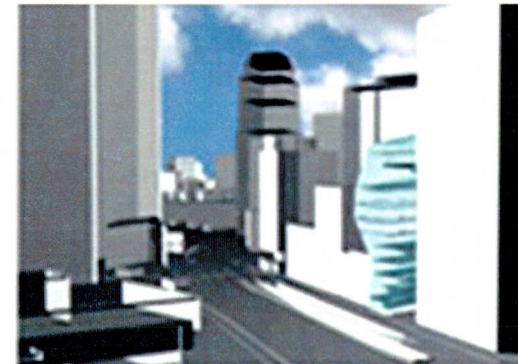
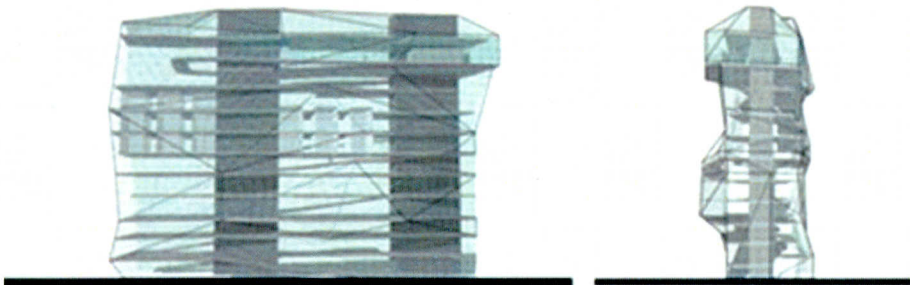
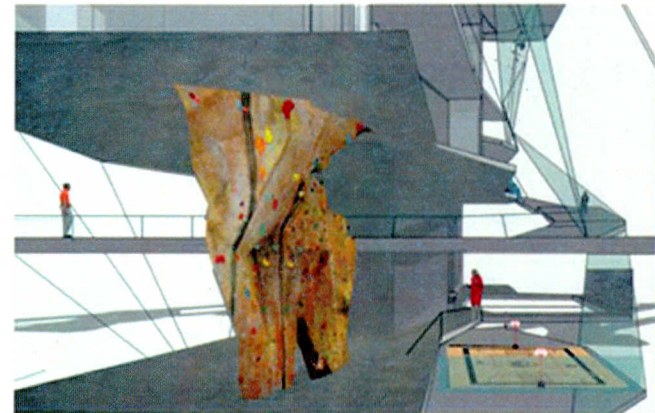
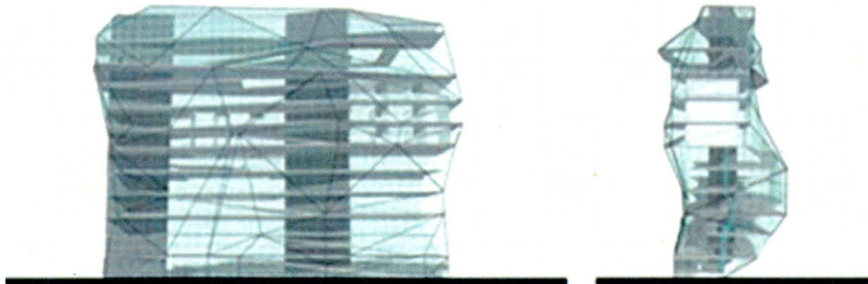
Through the employment of shifted and ramped floor plates the architecture makes movement through space a more invigorating a healthy experience. The footprint and overall shape that the building employs are inspired by the newly developing Rose Fitzgerald Kennedy Greenway, a series of parks and open spaces designed in an effort to bring more green space to the city.

The result is a greenway serving as a well populated civic space that encourages more healthy living and exercise. This healthy office building abuts the greenway and also has optimal views of Boston Harbor.





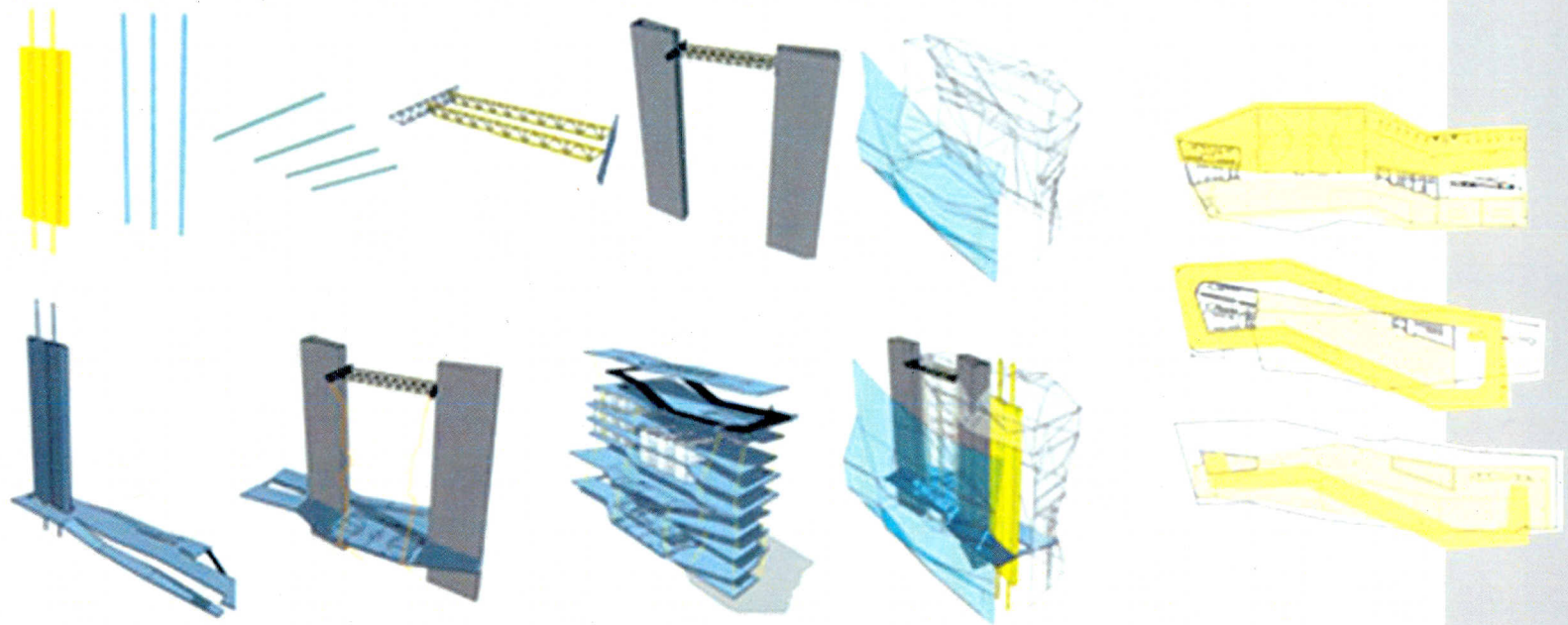
Each programmatic element determines the shape of the floors and ultimately the shape of the building. The goal is to have the necessary spaces cause movement within the plan. For instance in order to combine the program of squash courts with that of office space means that the regulated dimensions of the courts would cause the movement of the office space around it. The circulation and flow of people through and in between these courts caused the office space to be skewed and angled to provide for a functional space in plan. Sectionally, the double height of these squash courts causes the space to penetrate into and through a programmatically office floor and then be modified. The squash courts push up into office space and then flex to become the layout shape for conference and meeting rooms on that floor.



From the exterior the building was designed with the skyline in mind at a modest 16 stories the building shifts and ramps as it moves upward. The skin of the building is designed to conceptually “shrink wrap” the exterior to accurately illustrate the moving gestures both within the building and through the site. This skin is semi structural helping to provide stability to the more centralized core structure system while also being designed with the health and comfort of the employee in mind. This triangulated skin allows for ample light to penetrate the spaces and also for operable and individual climate control.

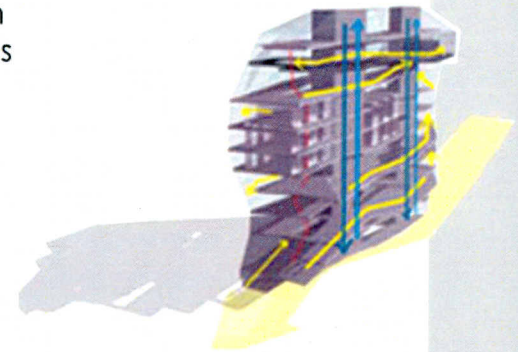
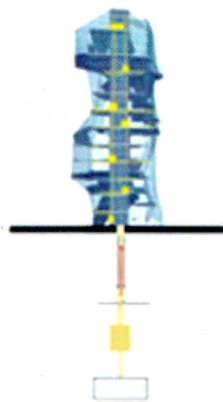






The structure of the building is a complex system consisting of two structural cores assisted by an upper level truss system, structural climbing walls and a semi-structural triangulated skin.

The building is heated and cooled through a system of 20 thermal wells located 1500 feet below ground. This system allows for individual heating and cooling floor to floor, space to space.







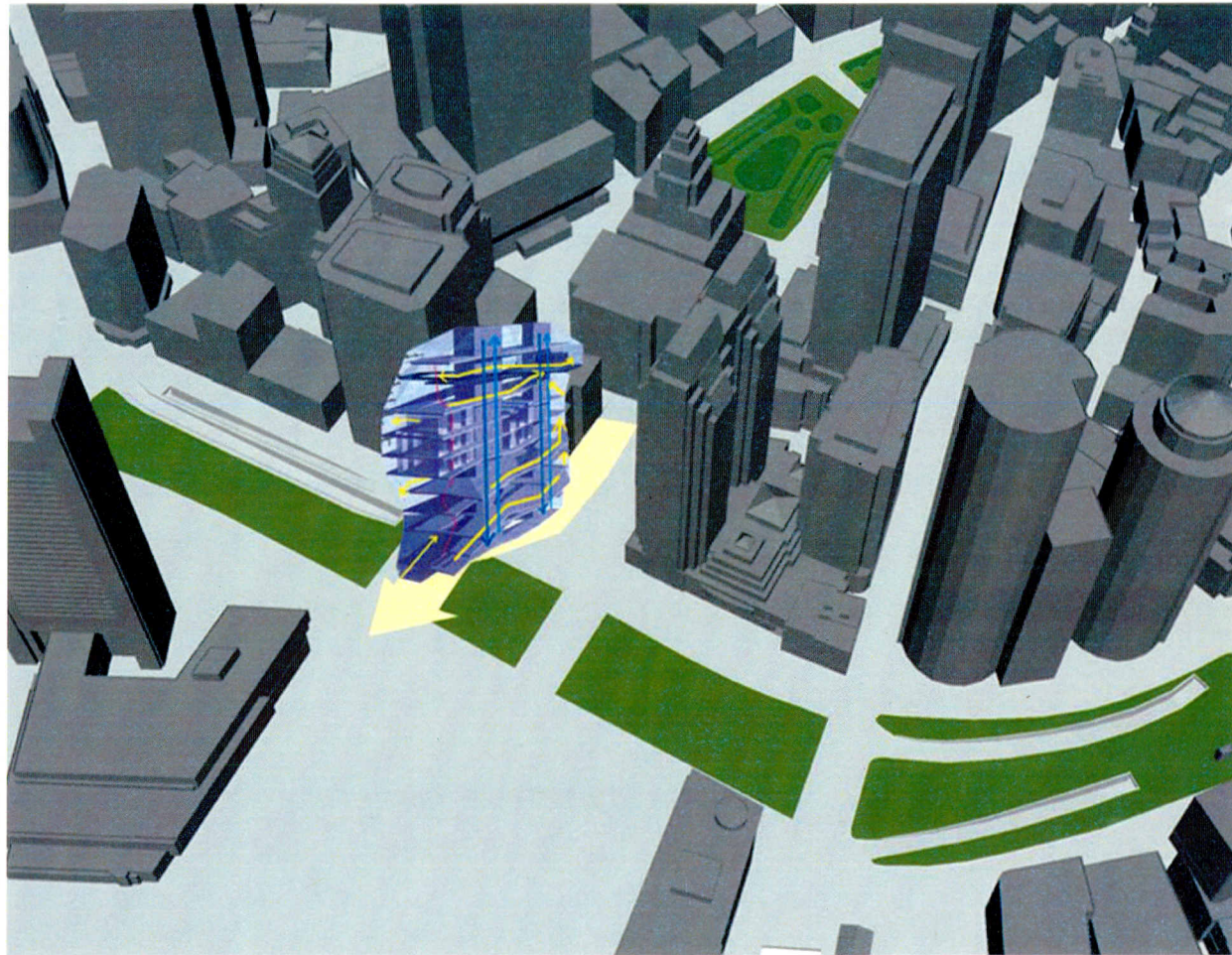
*Everyday circulation becomes fitness inspired by honest visual movement that reacts and responds carefully to the needs of each user and the potential of the chosen site.*





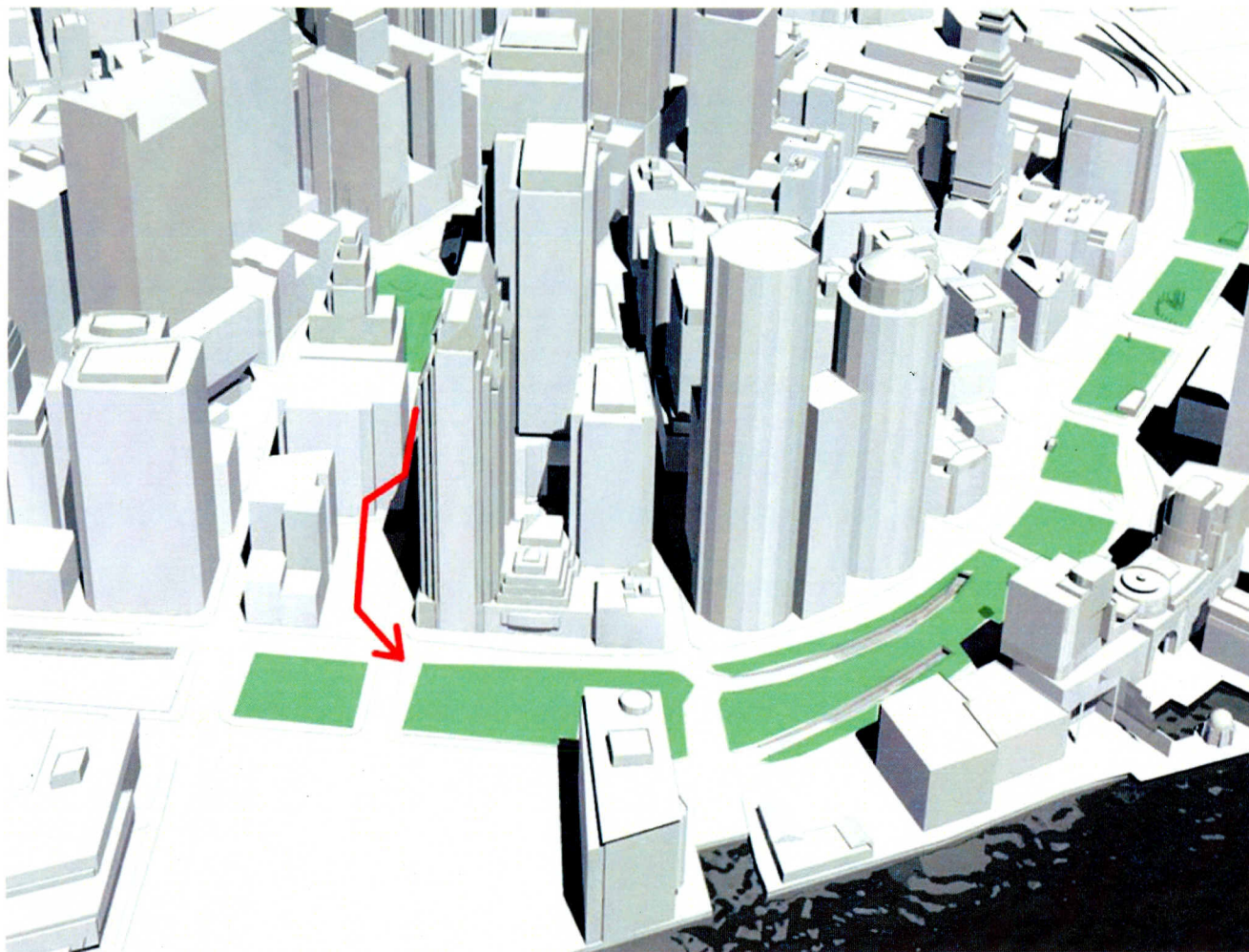
**Site Plan:** Fitness office Financial District Boston, Massachusetts



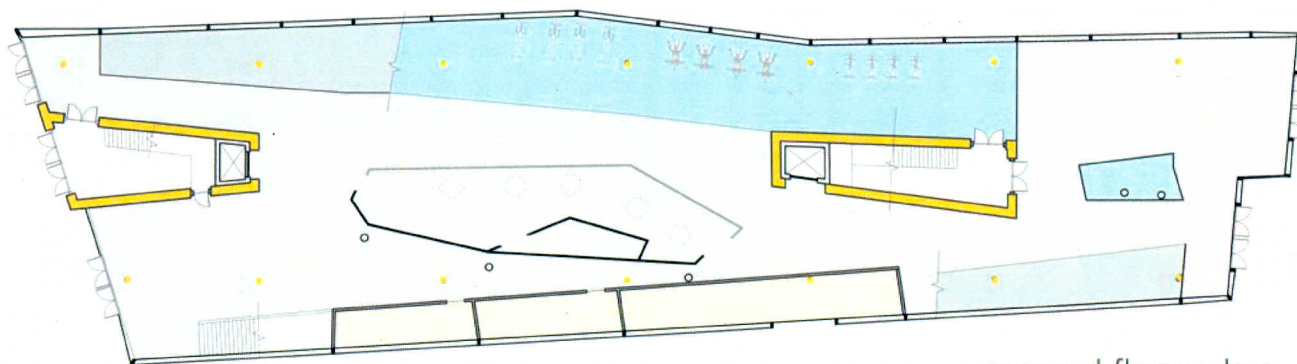


Throughout the building, circulation takes priority, entire floors become ramped and move throughout the building in long sweeping gestures that link spaces and floors. This architecture incorporates the movement of vertical circulation in to every action of the office. The eleventh floor consists of a modified running track that is the realization of the general circulation throughout the rest of the building. This sloped element becomes both a visual sculptural element and a functional fitness space with optimal greenway view.





**Site Movement Diagram-** The movement through the site is essential in allowing people to access the Greenway. The ground level allows people to come from within the city through to the new greenway. This pattern of movement also speaks for the flow of the greenway, the water and people within the building.

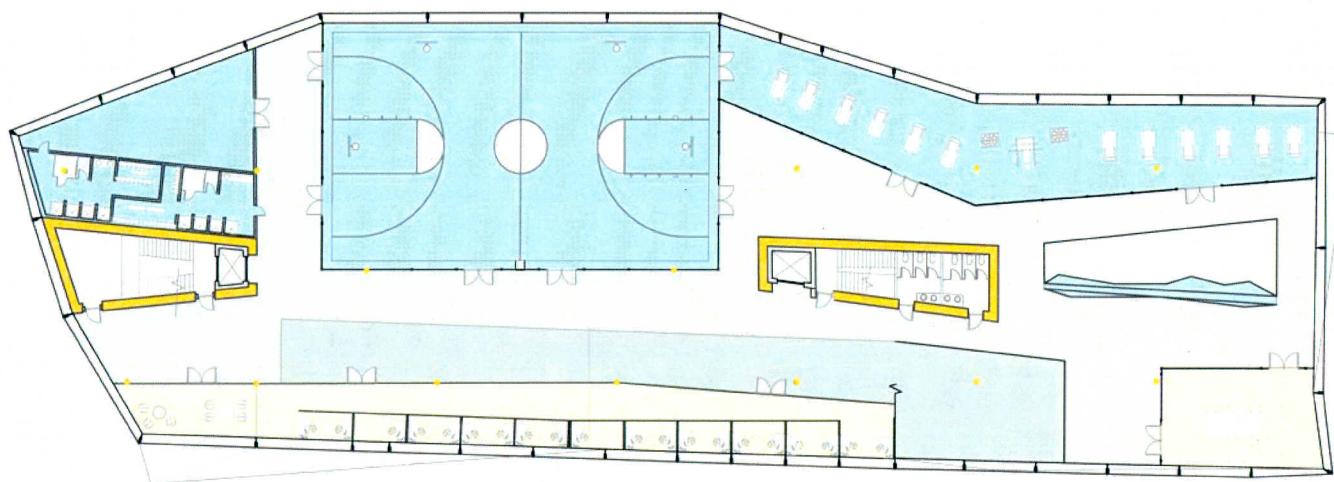


ground floor plan

Ramping planes incorporate exercise into everyday activity while functioning as office and workout spaces and optimizing views.

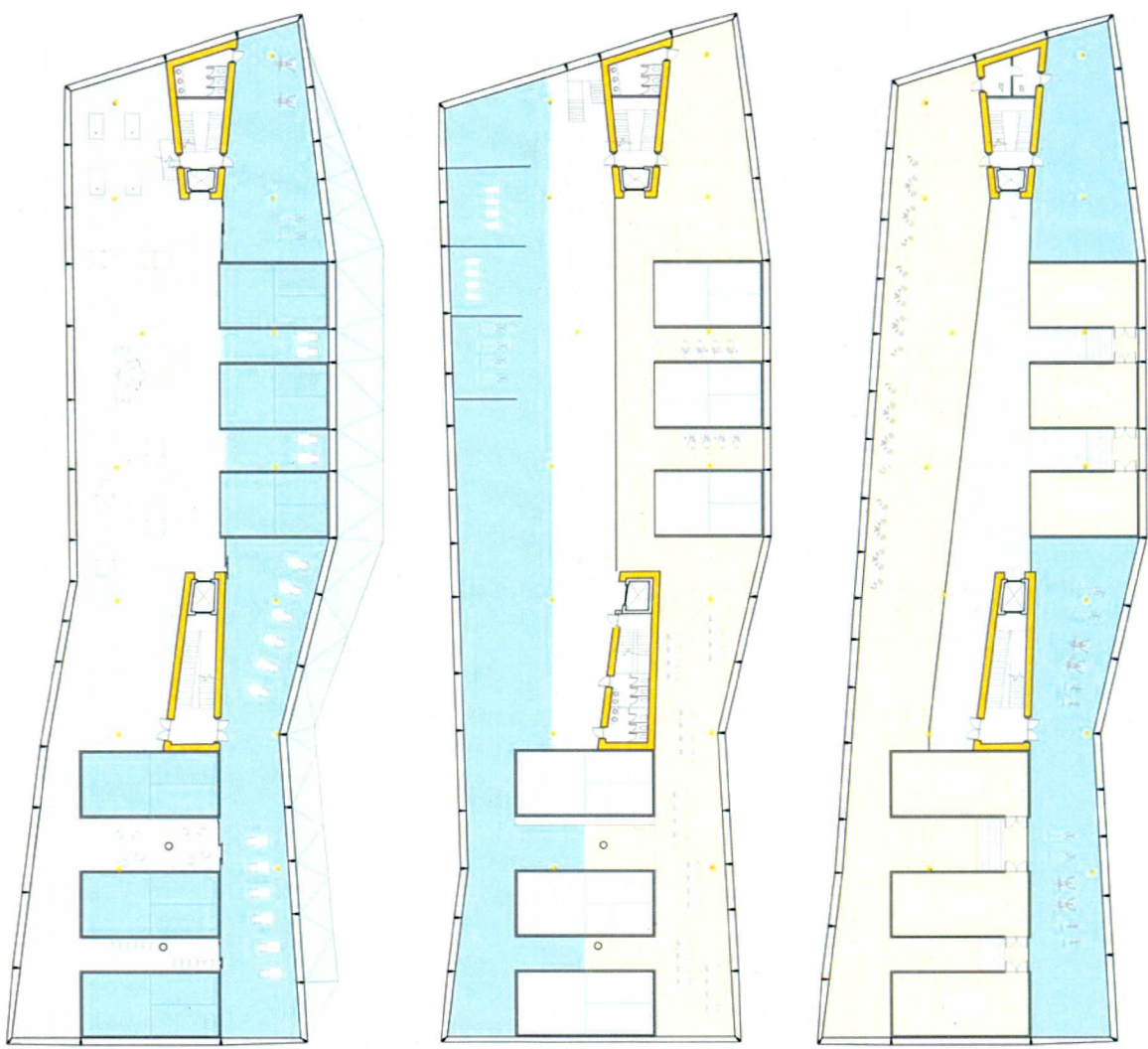
Egress cores support the building structurally allowing floor plates to shift and move in and out.

Opposing program are juxtaposed to create a visual merge of program.

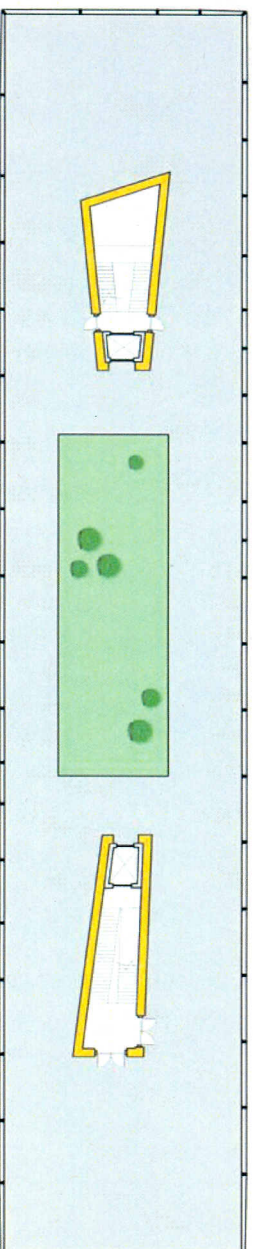


fourth floor plan

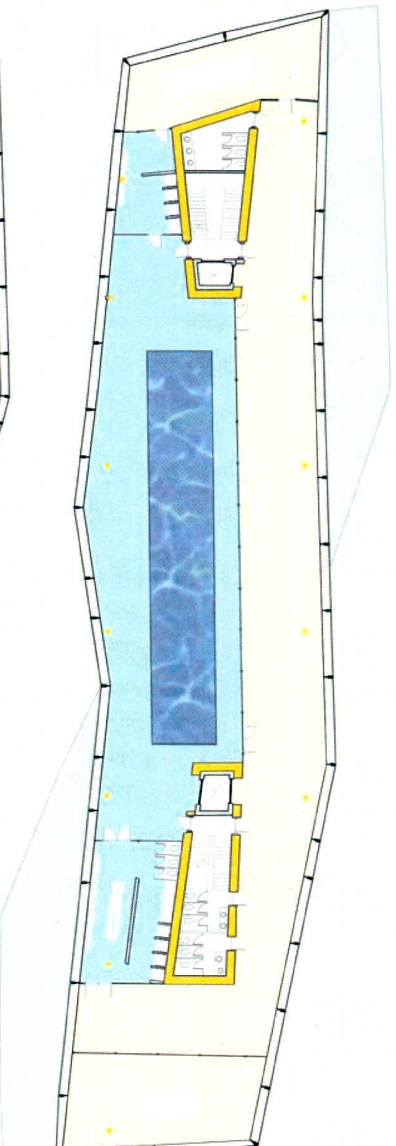




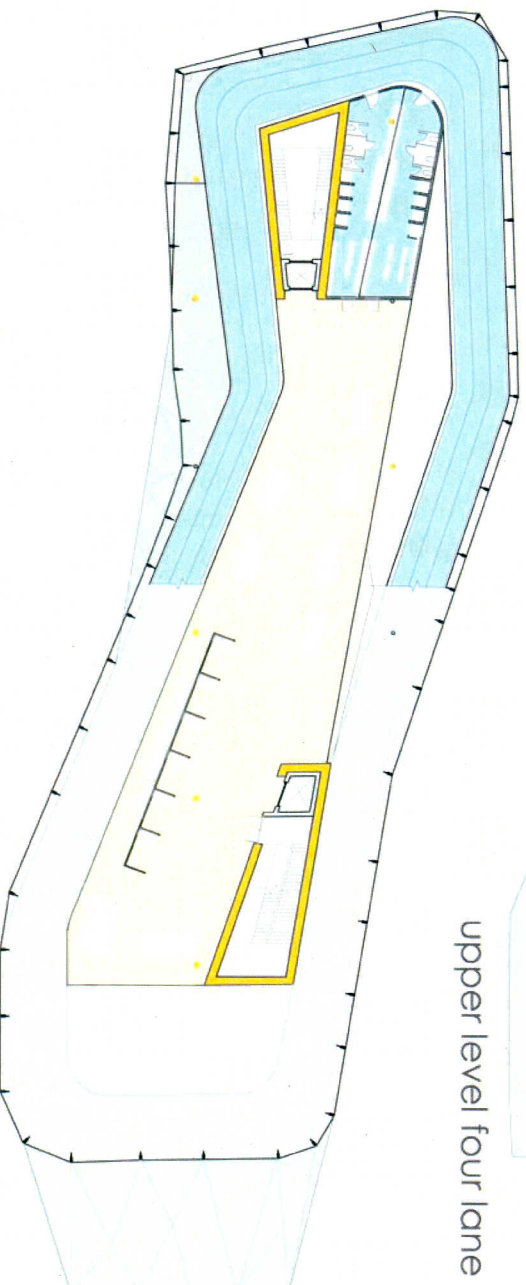
floor plans five-eight



roof plan

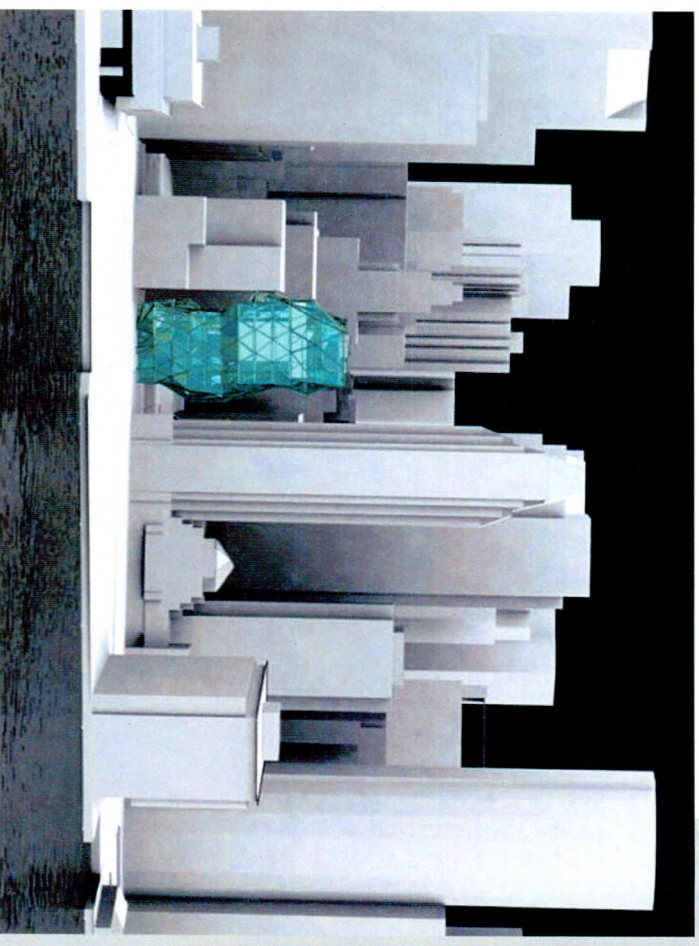
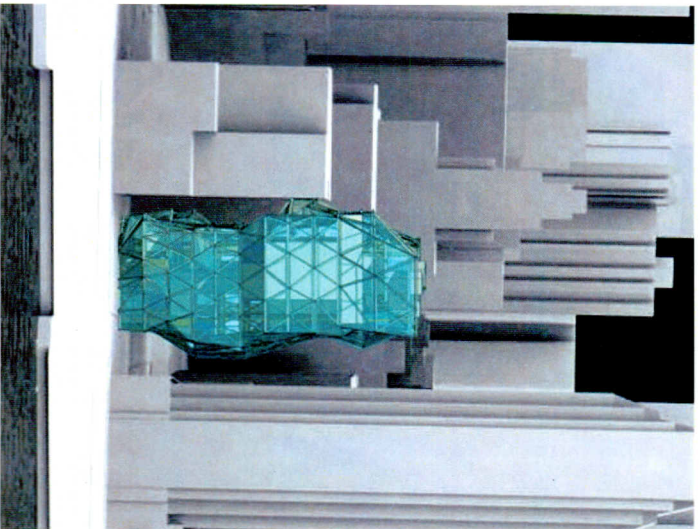
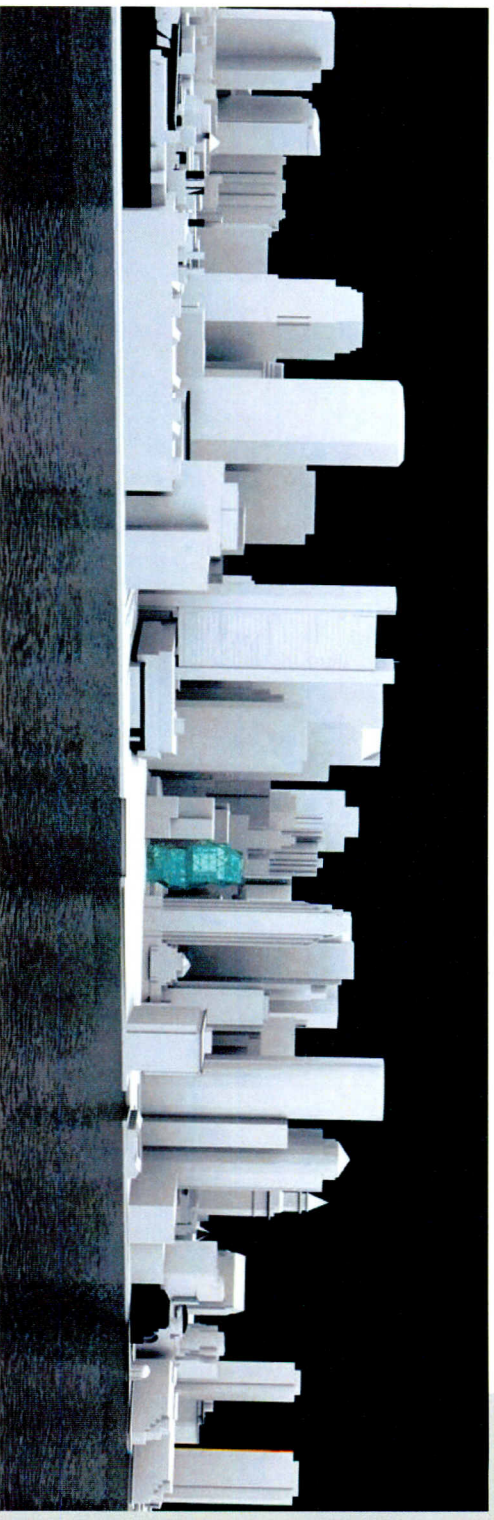


upper level four lane lap pool

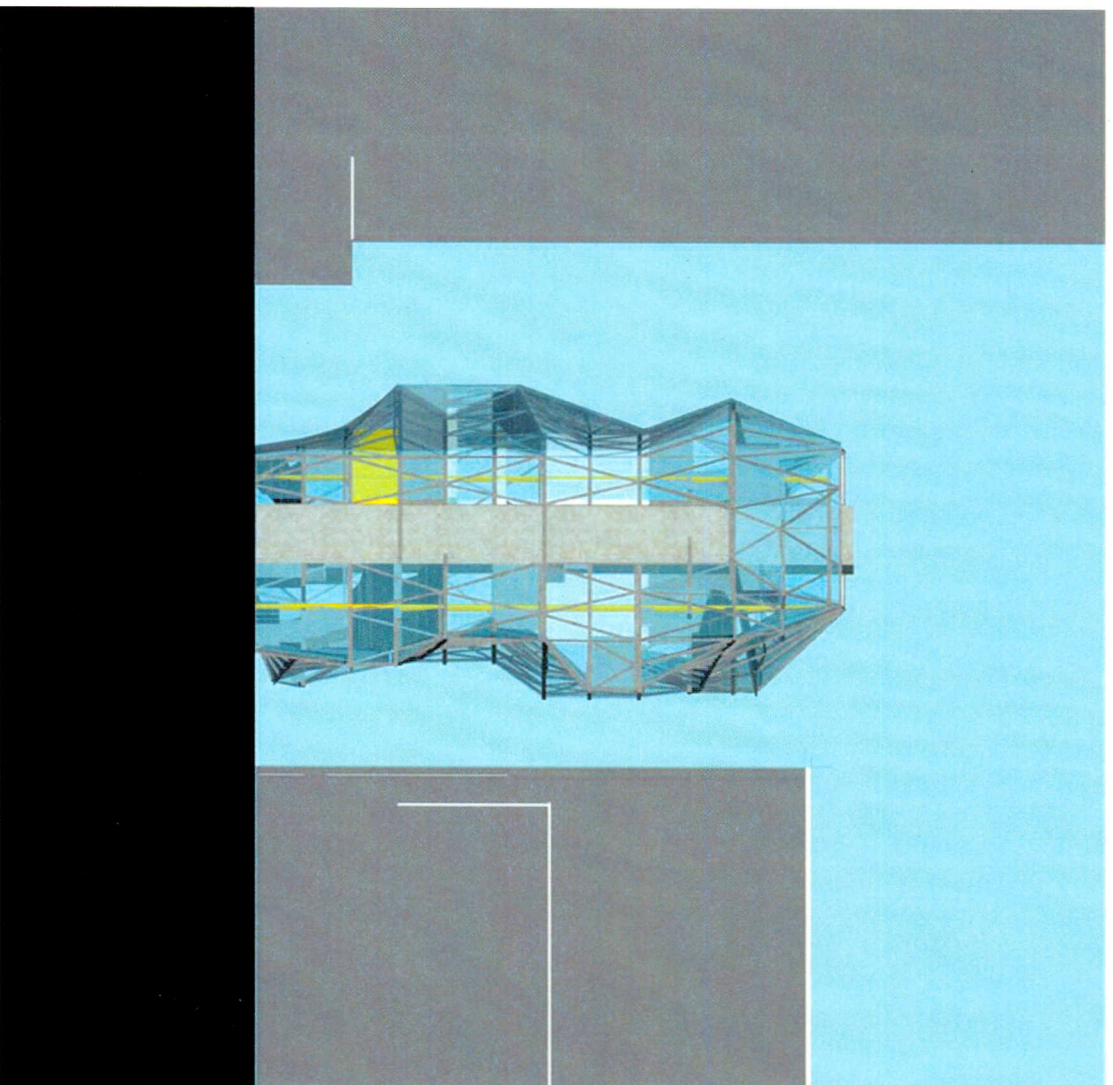


indoor sloped 200m track levels twelve - fourteen



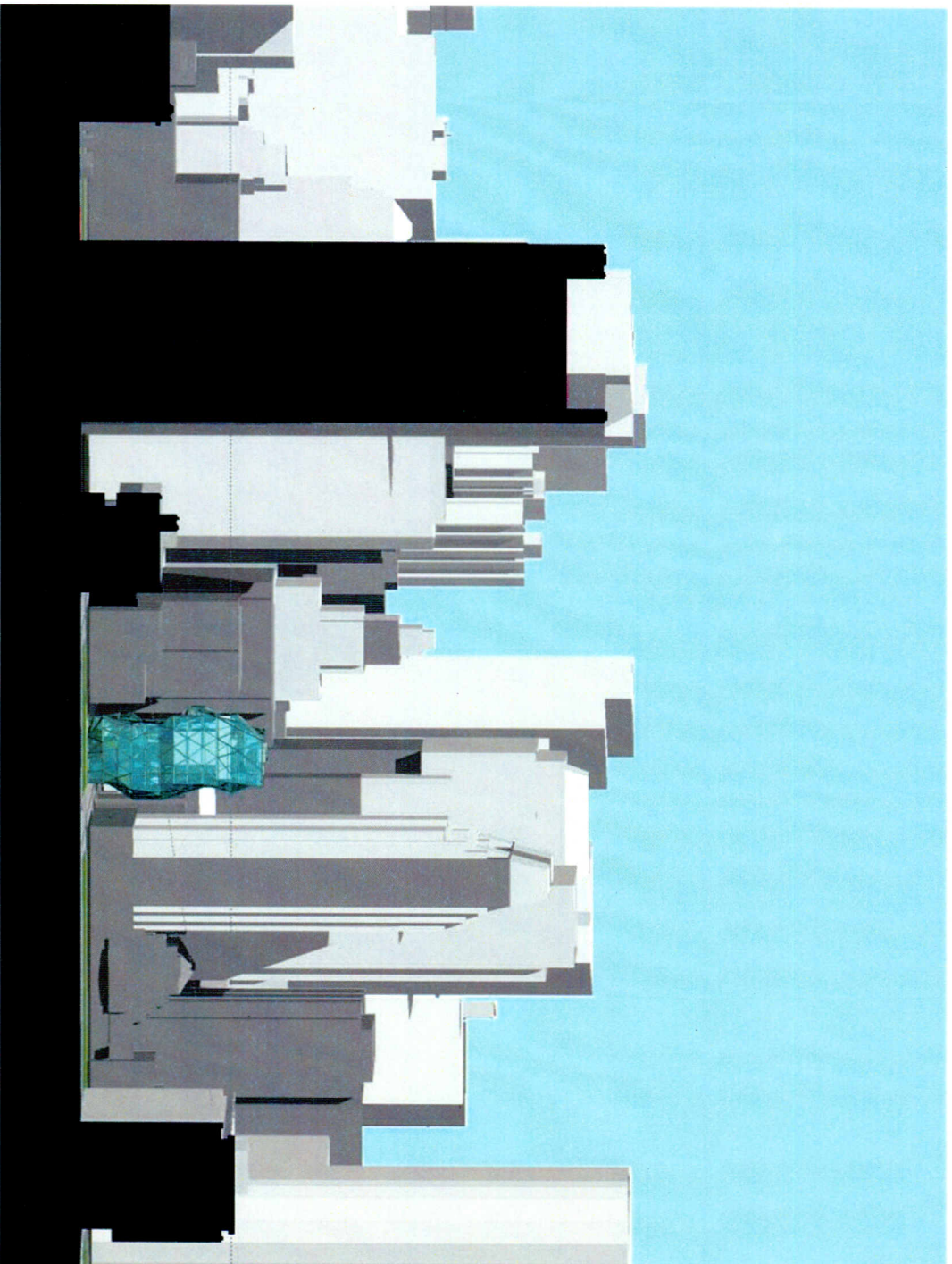


elevational perspectives from Boston Harbor

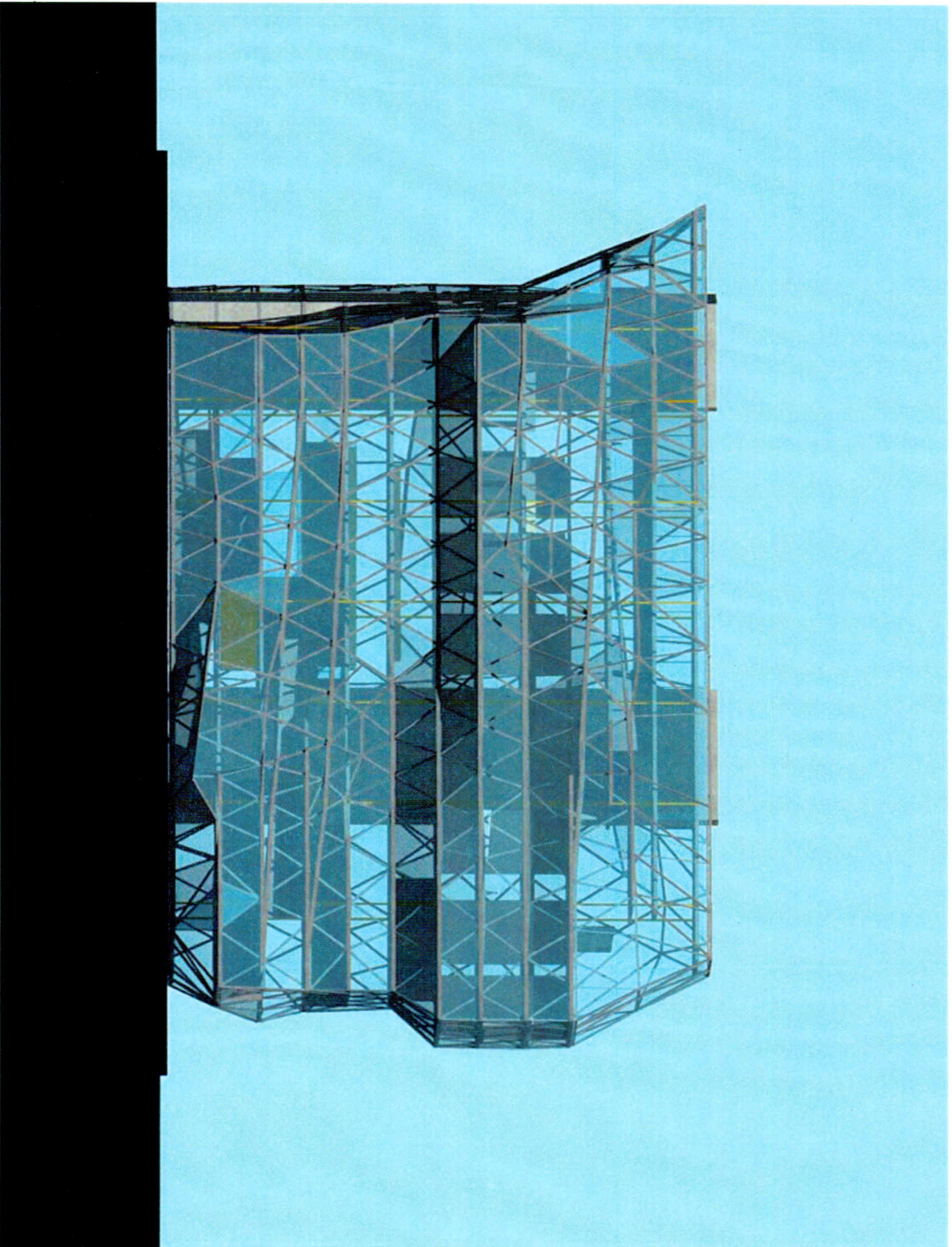


north elevation



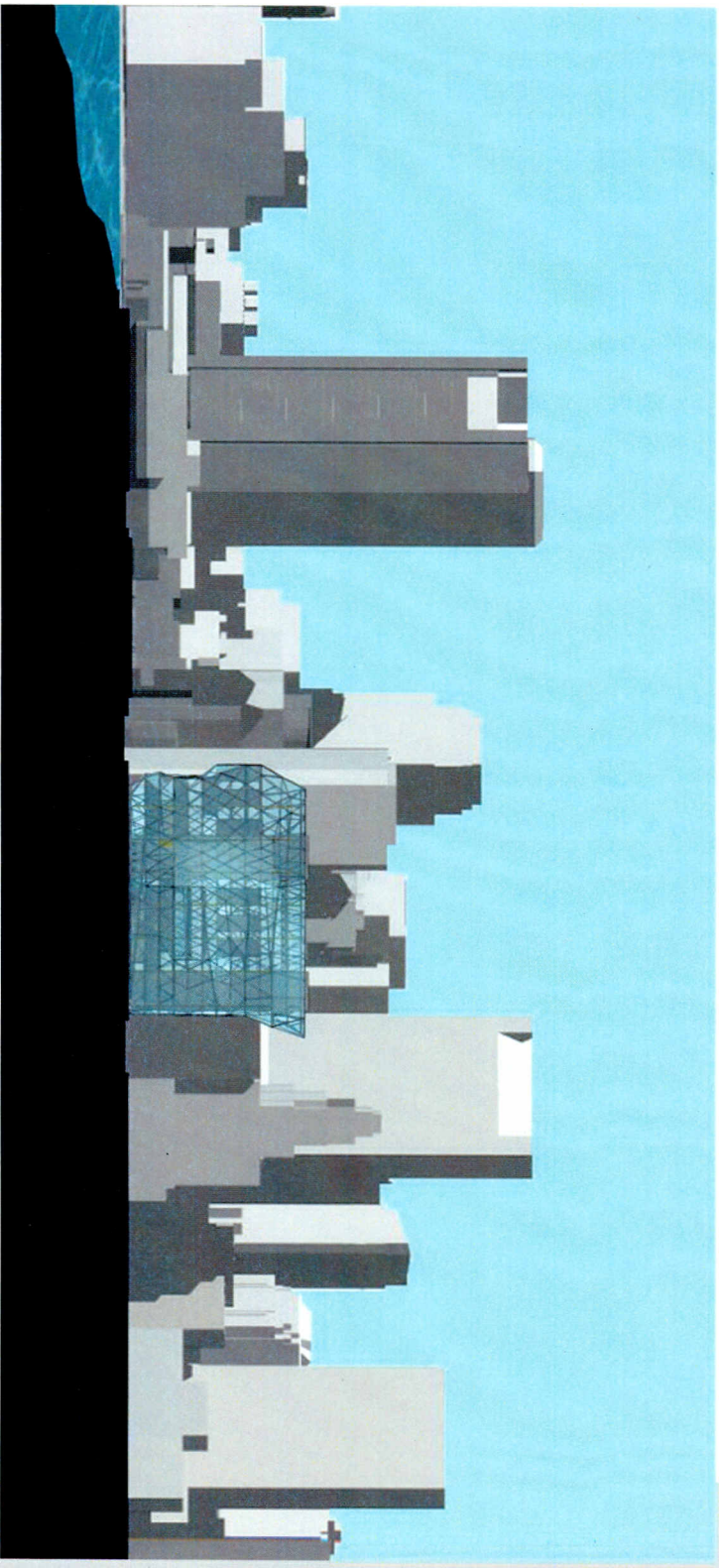


south elevation

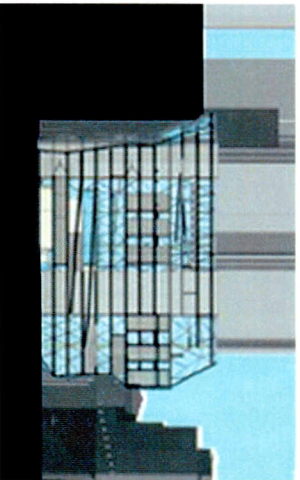
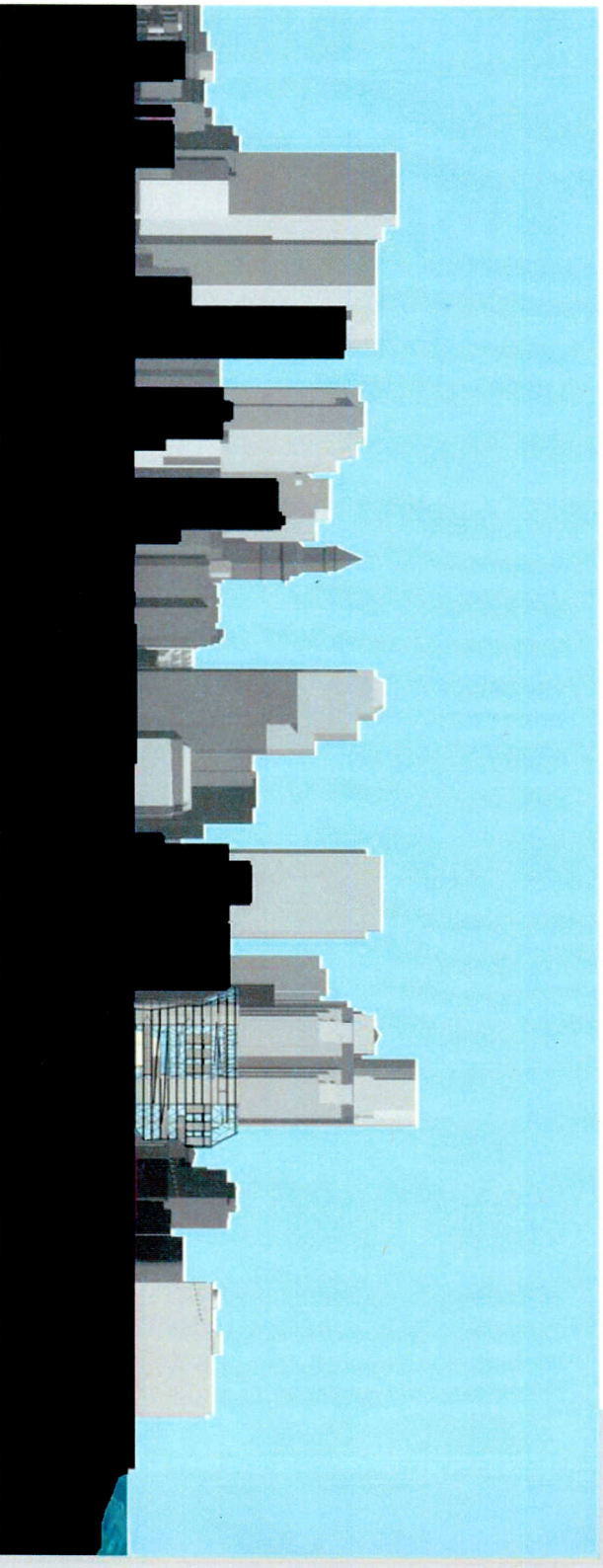


east elevation



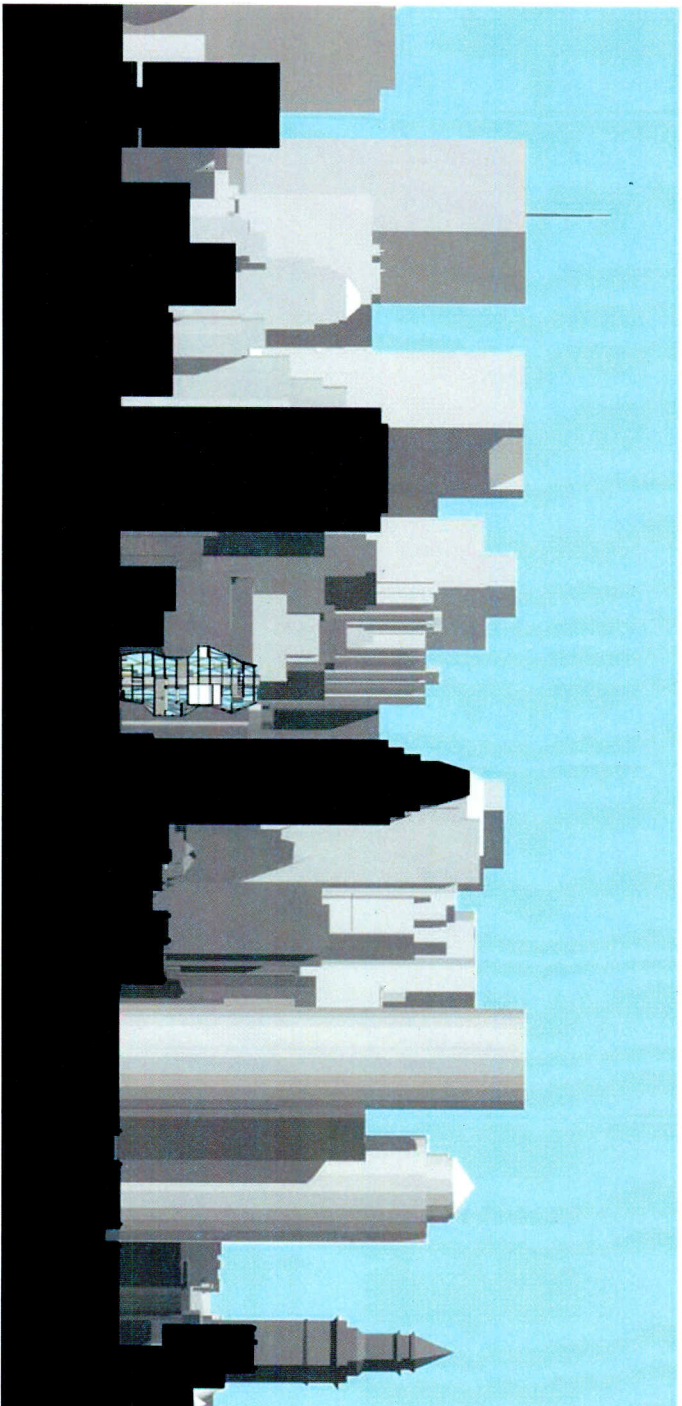


north-south site section looking west



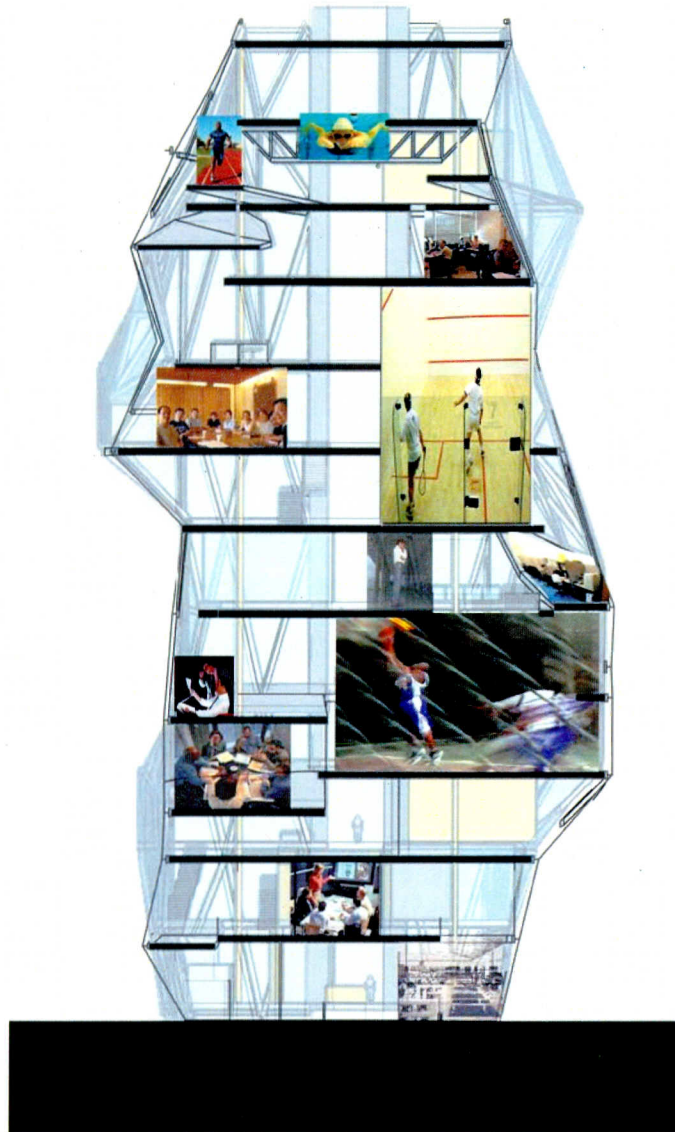
north-south site section looking east





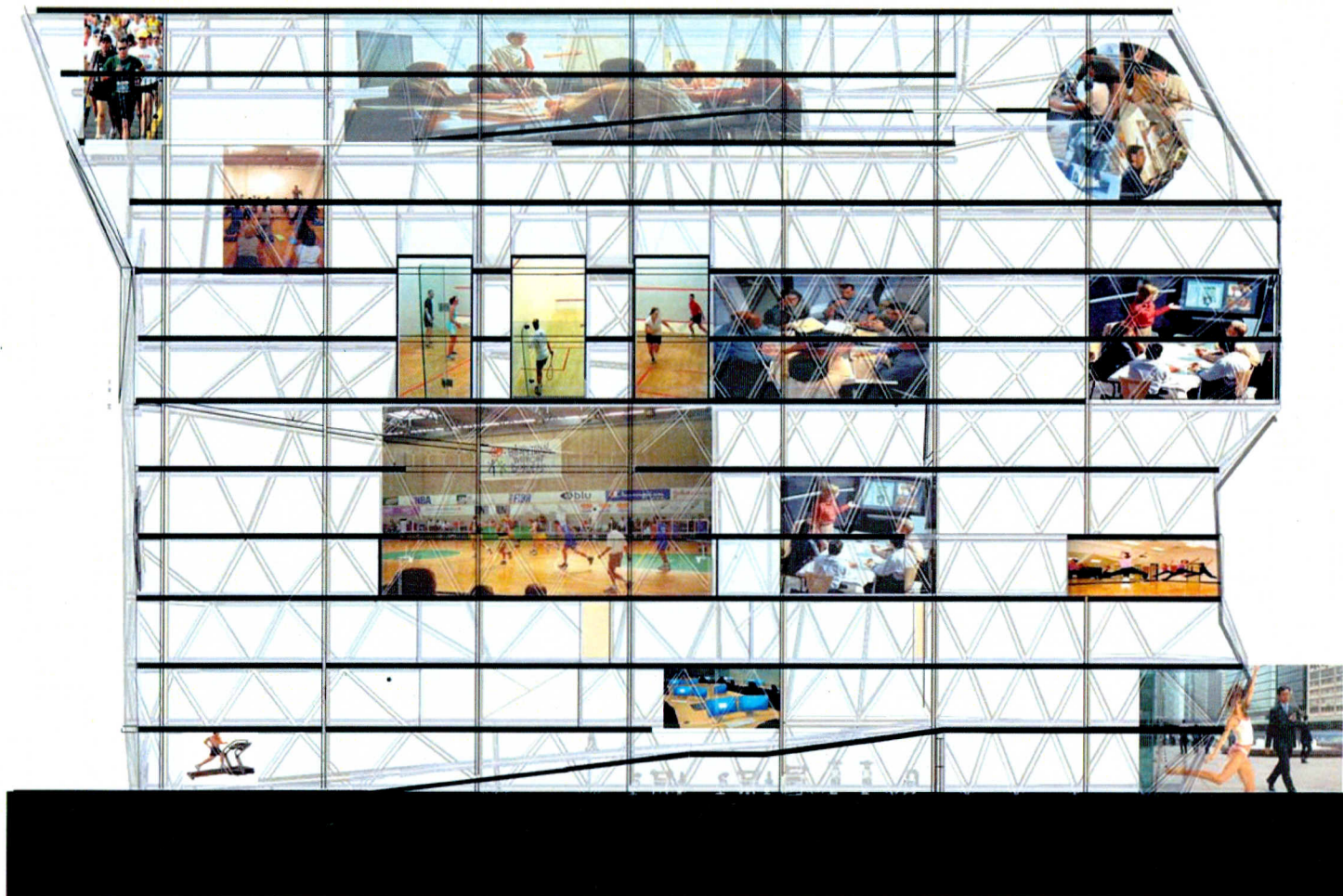
south section

Through the design of spaces, and programs people can interact on many different levels. The fitness office weaves program together while keeping a productive and healthy atmosphere making the workplace more dynamic and enjoyable and the fitness spaces exciting, convenient and available.



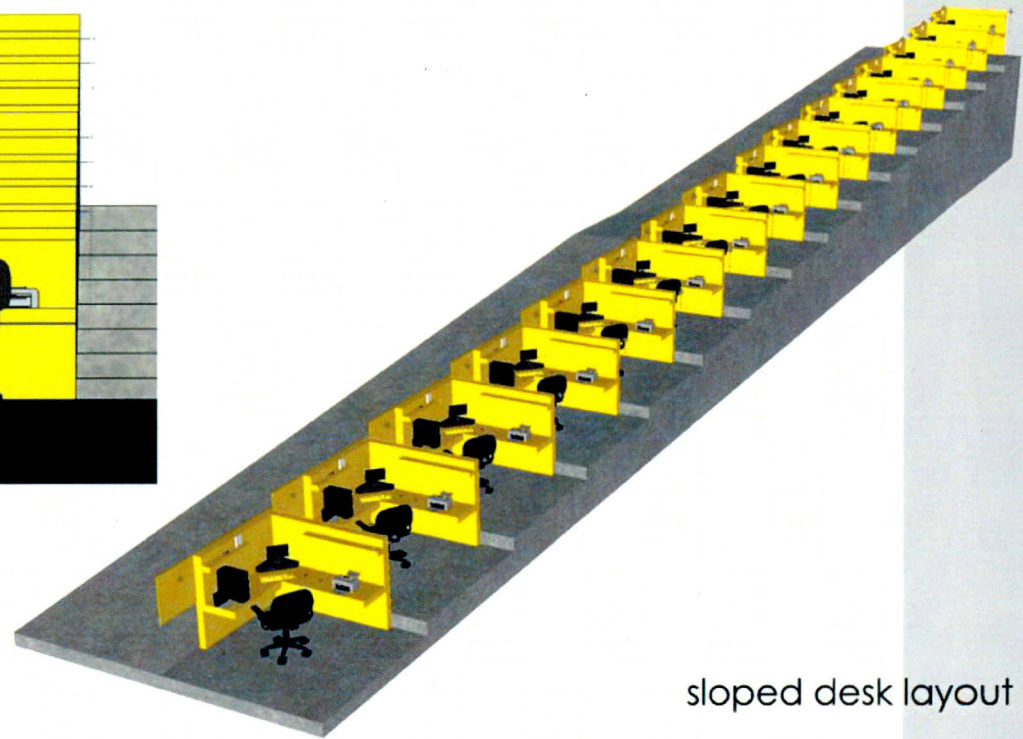
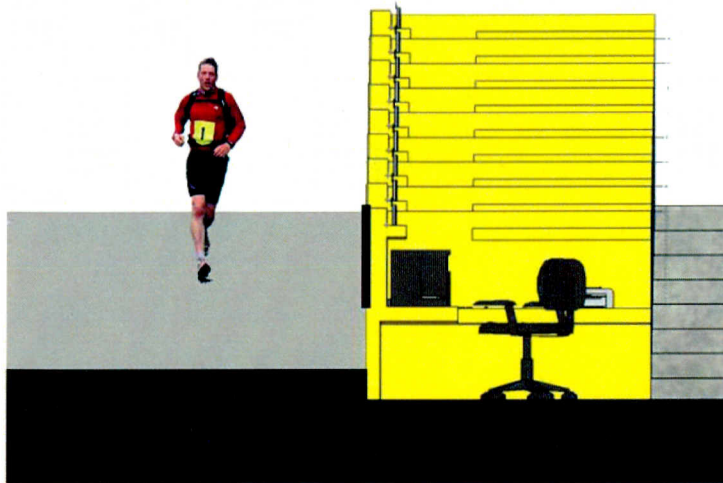
north building section



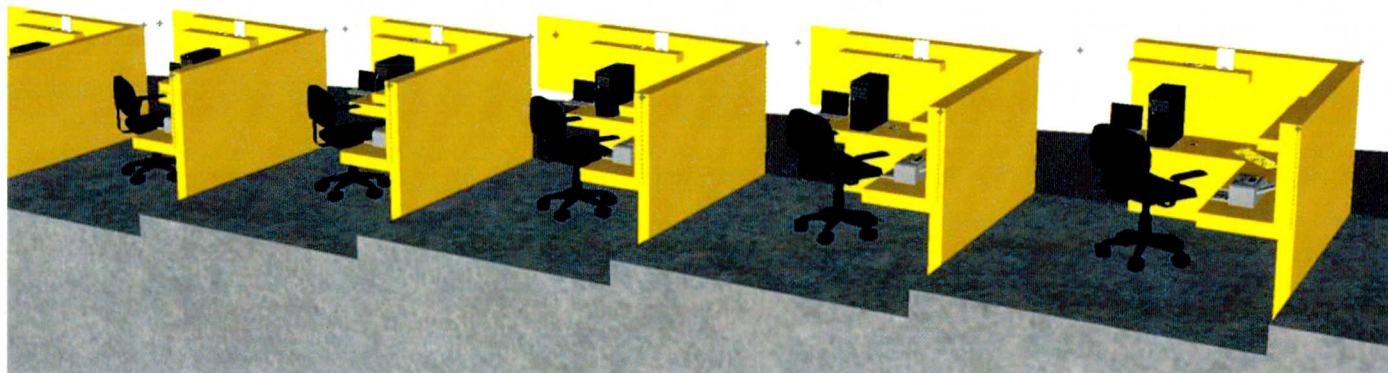


east building section

Suspended program allows employees to experience fitness areas without making an extra effort. The interaction between programs creates more movement within dynamic spaces. The designated office space mimic the fitness spaces that it encounters simulating that layout and movement.



sloped desk layout

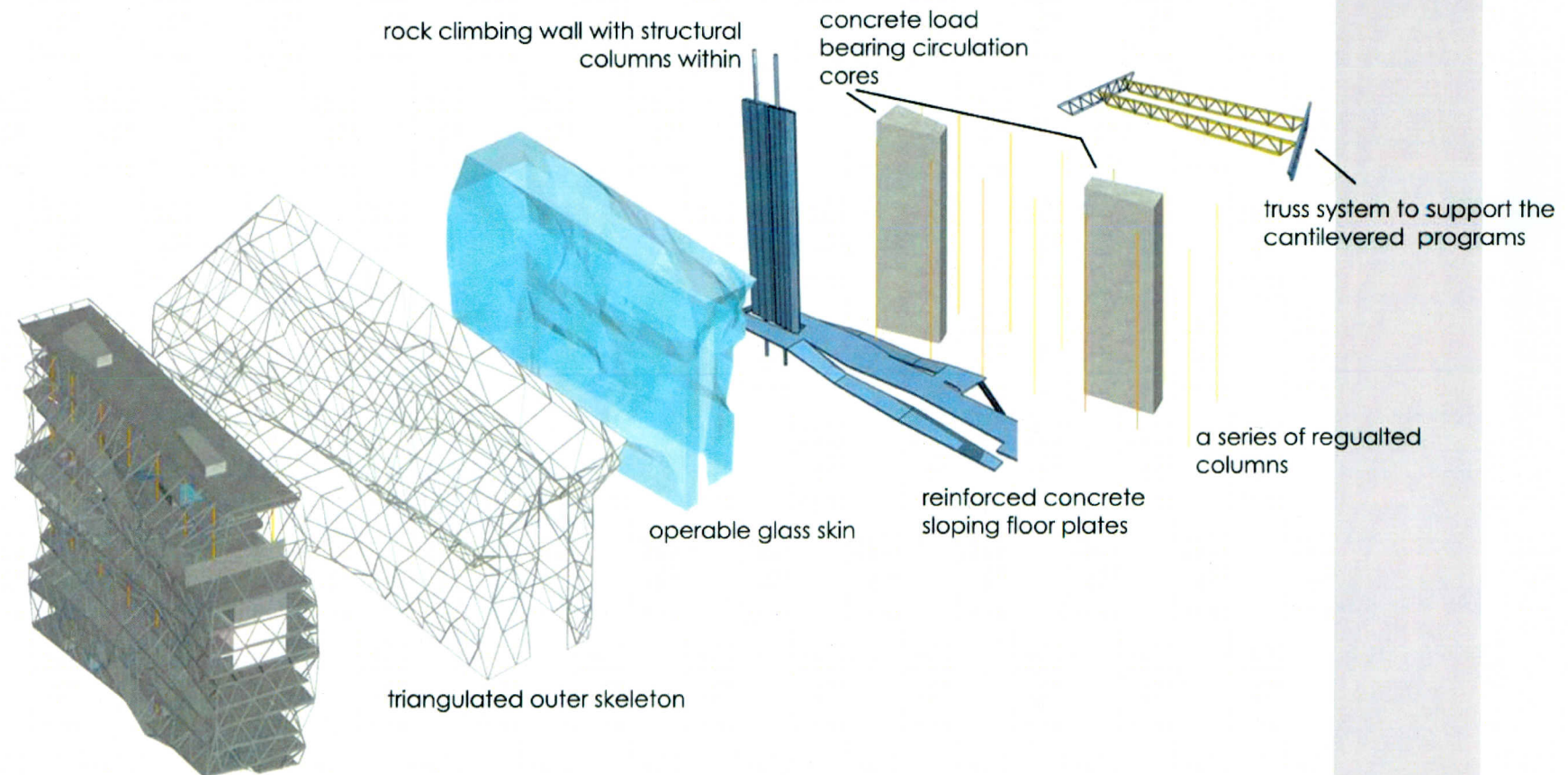


Sloping floor plates allow people to incorporate exercise into their day without making an extra effort and also makes travel through the office more enjoyable, but these ramps also serve as desk space for many employees. This system serves as a function office space for workers as well as a unique workout space.



***In order for the office gym to create and encourage movement, it must become an active body within a skin; it must move.***

diagram of structural systems

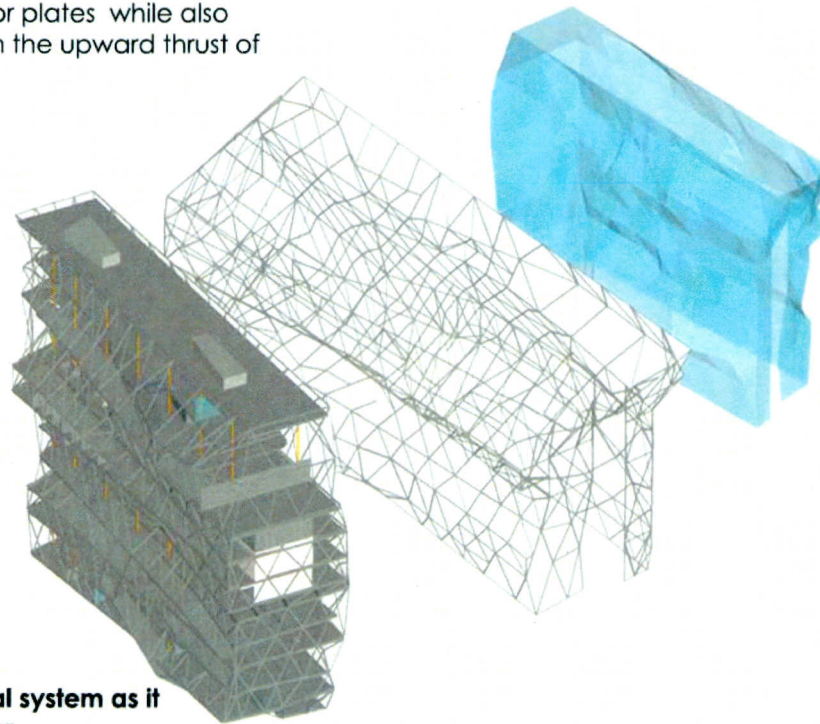


the total structural system as it functions together

***The structure of the office-gym most clearly illustrates this movement, it consists of six systems working together to support sloping floors and shifting plates.***

### triangulated outer skeleton

the triangulated skin consists of structural members that follow the shifting floors. The structure cannot support the building without the assistance of the cores and the columns, but it helps to stabilize and support the floor plates while also protecting from the upward thrust of wind-loads.



### the total structural system as it functions together

a series of components working as a moving body- 13 floors, 16 columns, two cores, triangulated skin, box truss system, and operable skin

### diagram of structural systems

#### operable glass skin

The operable glass skin sits within the triangulated structure of the outer skeleton it serves to carefully separate the outside from the inside while appearing light and permeable.



## diagram of structural systems

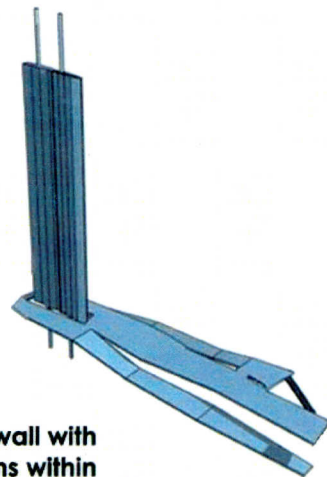
### a series of regualted columns

Full heights columns every 18' help to stabilize and support the floor plates, distributing the weight and taking some of the load off of the cores.

### truss system to support the cantilevered programs



A system of four trusses can be found on the twelfth floor. This system serves to support the cantilevered load on the east side of the building. Cables run from these trusses to the fourth floor, they then transfer that load to the circulation cores (on which they are supported) through to the ground.



### rock climbing wall with structural columns within

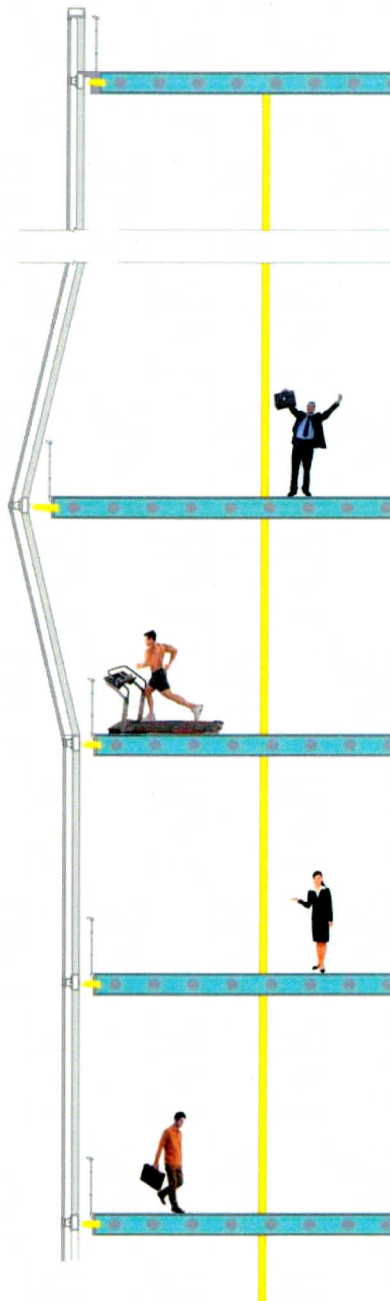
structure is placed within this programmatic element to help support the weight of the south end of the building. The wall can shift and bend to provide an exciting climb while the columns within stay vertical.

### reinforced concrete sloping floor plates

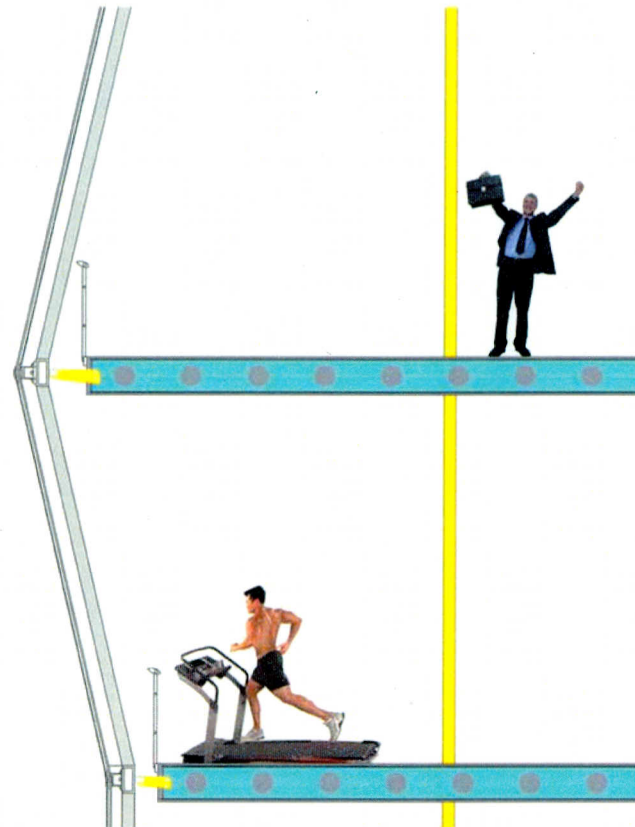
The floor plates rest on the cores and the column grid they are reinforced and cast on site to create custom shapes and slopes. These ramping floors allow exercise to become a regular part of the everyday work place.

### concrete load bearing circulation cores

These large concrete cores are 18" thick and carry the majority of the load while also housing circulation program. The two cores serve to support the weight of the building and are balanced with the structural skin to distribute the building load to the ground.



wall section and building skin detail

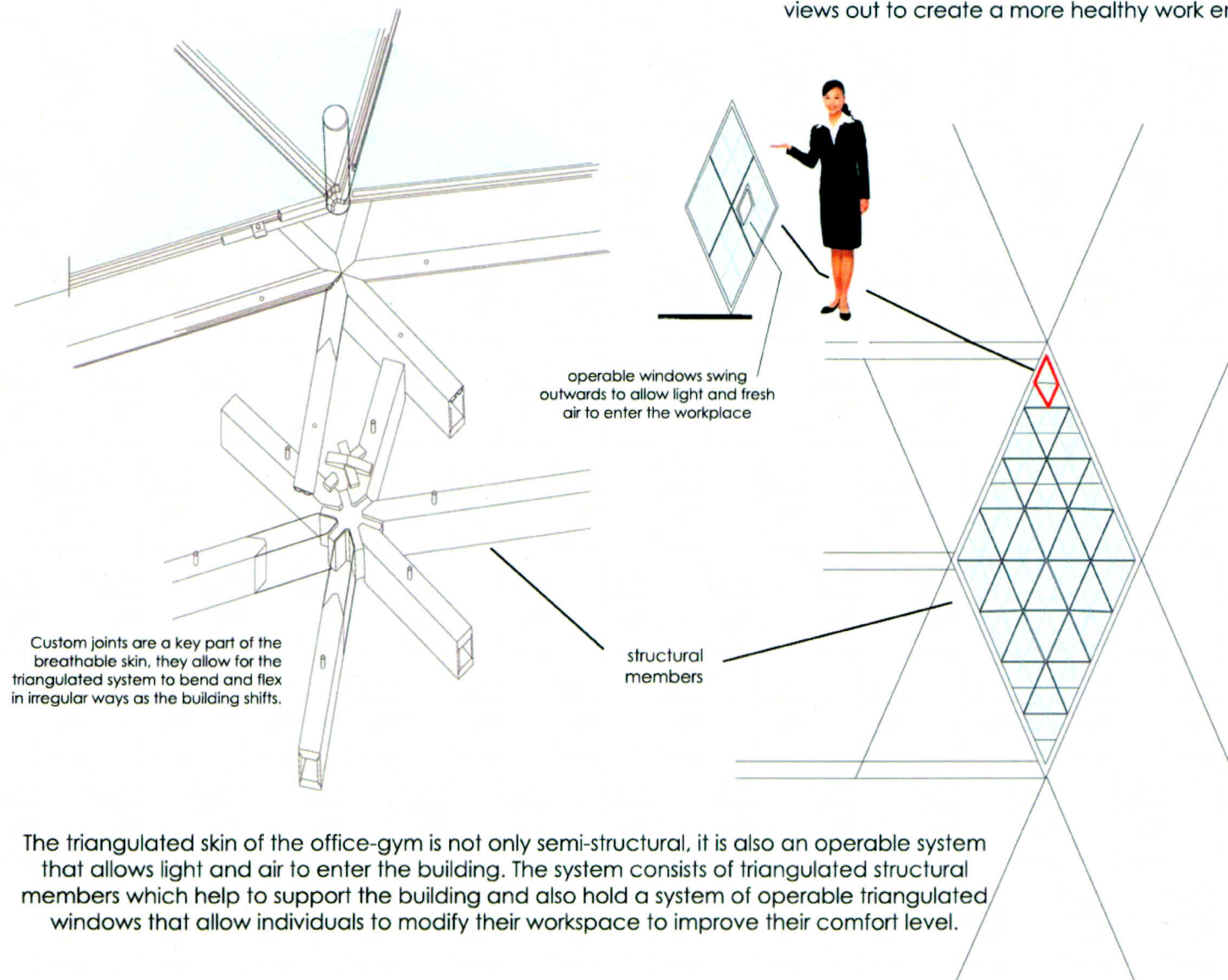


The building skin is designed to respond to the moves of the floor plates. The skin helps to stabilize the plates through a triangulated network. Each floor plate is reinforced and consists of structural members within, this allows for the skin to attach directly to each floor plate. By the skin connecting directly to the floors the columns can then be closer to the central cores thus decreasing their span and amount allowing for a more open space within. The connection between the floors and the structural skin occurs at the tip of the triangles so the load can then be distributed throughout the skin instead of to a single point. This type of connection also allows for visible clarity, the skin appears to hover as it wraps the inner structure and programs.

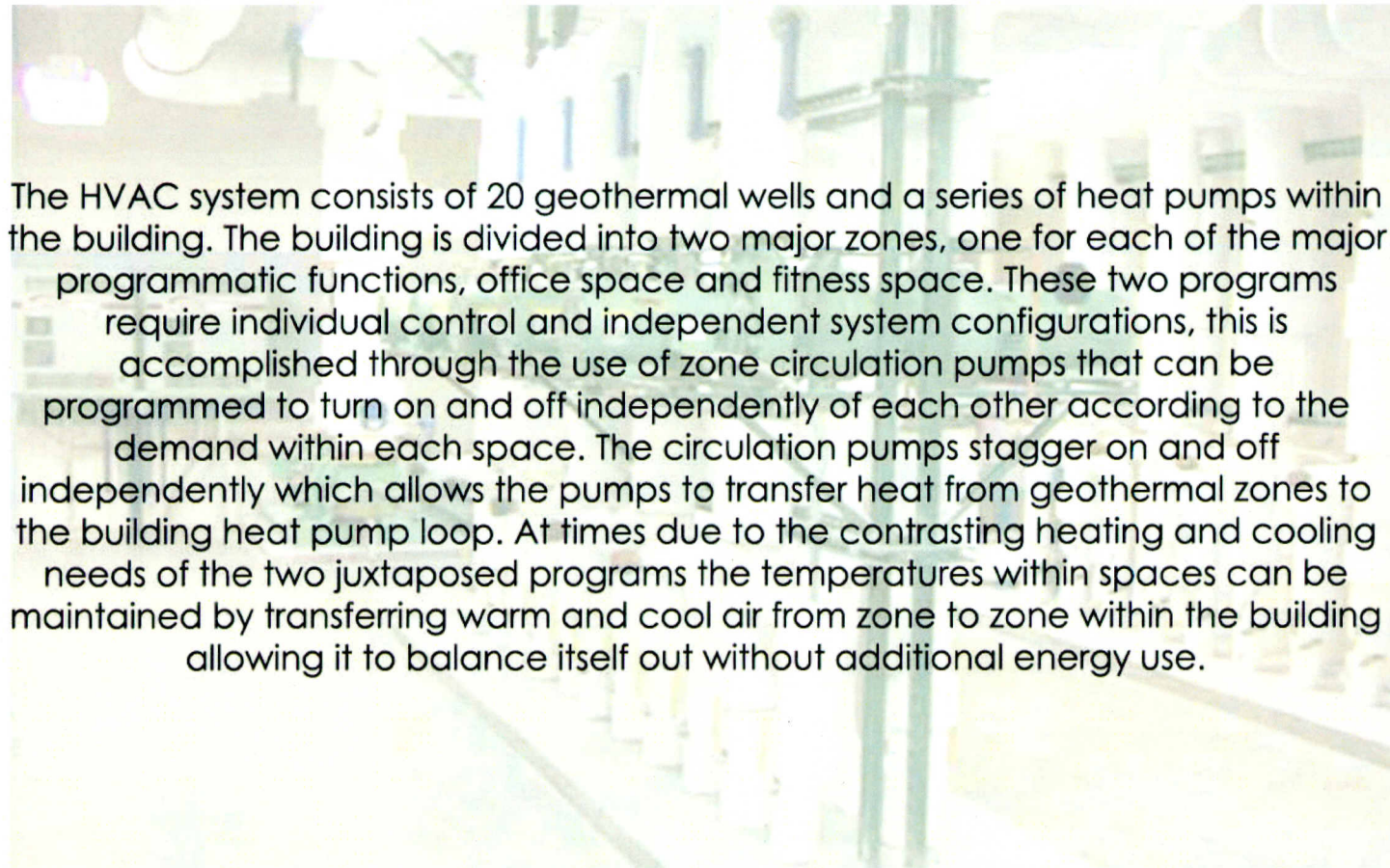


### operable window detail

operable windows allow natural light as well as ventilation and views out to create a more healthy work environment

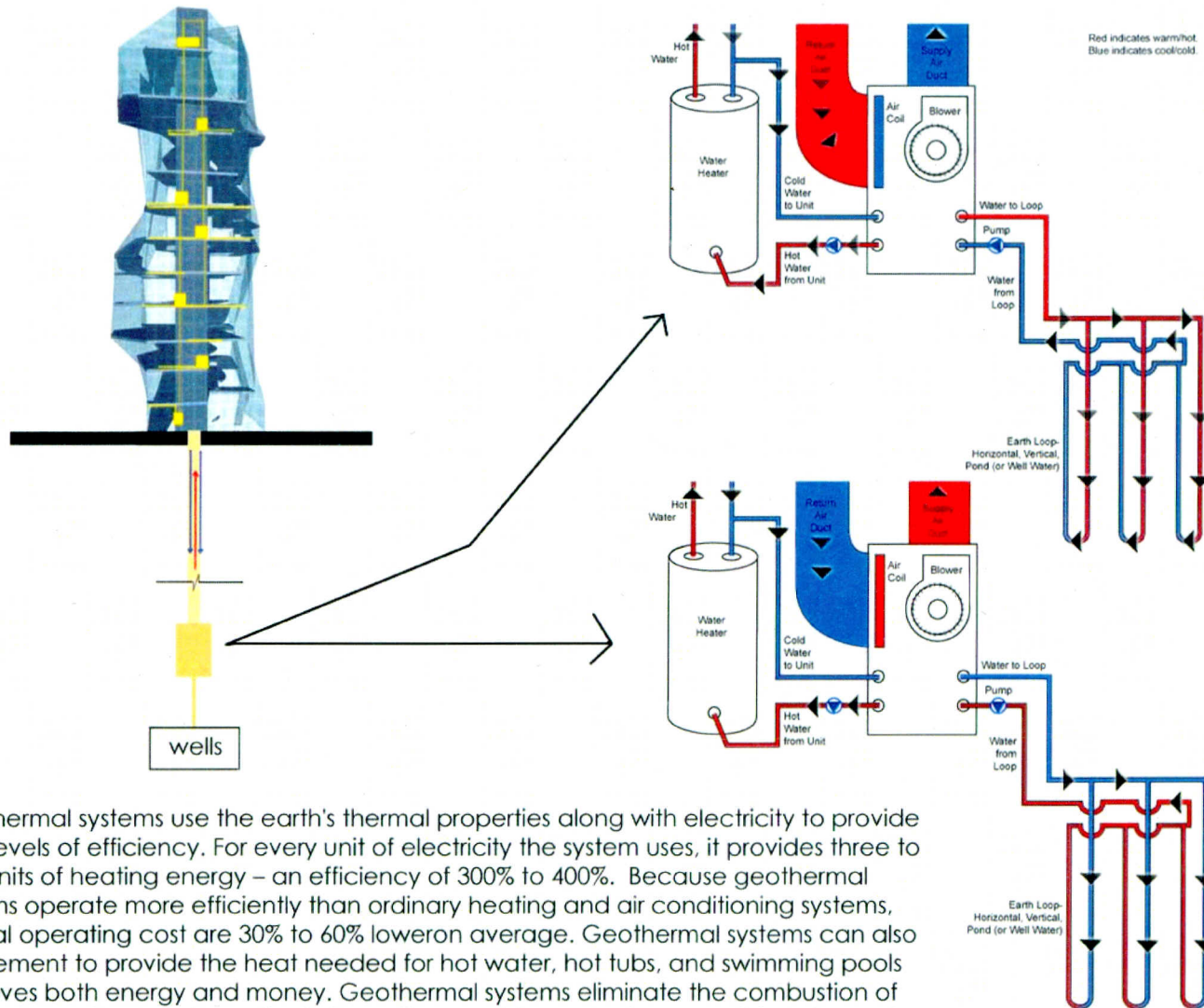


The triangulated skin of the office-gym is not only semi-structural, it is also an operable system that allows light and air to enter the building. The system consists of triangulated structural members which help to support the building and also hold a system of operable triangulated windows that allow individuals to modify their workspace to improve their comfort level.



The HVAC system consists of 20 geothermal wells and a series of heat pumps within the building. The building is divided into two major zones, one for each of the major programmatic functions, office space and fitness space. These two programs require individual control and independent system configurations, this is accomplished through the use of zone circulation pumps that can be programmed to turn on and off independently of each other according to the demand within each space. The circulation pumps stagger on and off independently which allows the pumps to transfer heat from geothermal zones to the building heat pump loop. At times due to the contrasting heating and cooling needs of the two juxtaposed programs the temperatures within spaces can be maintained by transferring warm and cool air from zone to zone within the building allowing it to balance itself out without additional energy use.





Geothermal systems use the earth's thermal properties along with electricity to provide high levels of efficiency. For every unit of electricity the system uses, it provides three to four units of heating energy – an efficiency of 300% to 400%. Because geothermal systems operate more efficiently than ordinary heating and air conditioning systems, annual operating cost are 30% to 60% lower on average. Geothermal systems can also supplement to provide the heat needed for hot water, hot tubs, and swimming pools this saves both energy and money. Geothermal systems eliminate the combustion of fossil fuels on site and dramatically lower the need to generate power this reduces the emission of greenhouse gasses and the environmental damage associated with the use of nonrenewable resources such as oil. Geothermal wells are a responsible and healthy alternative to oil and also allow for many spaces to be individually controlled and adjusted within one HVAC system.

Image from: [www.bomarenergy.ca/geo.html](http://www.bomarenergy.ca/geo.html)



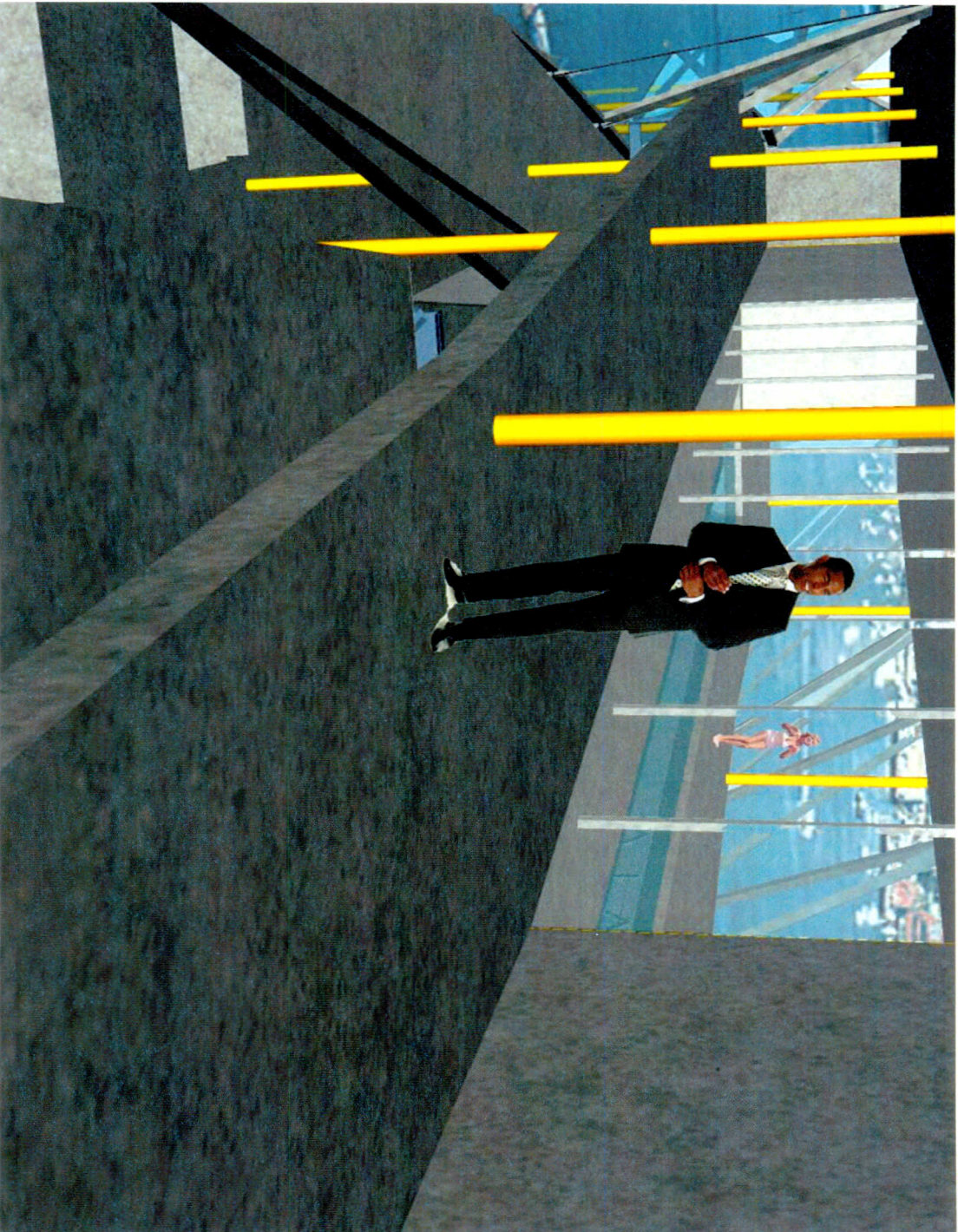
interior perspective





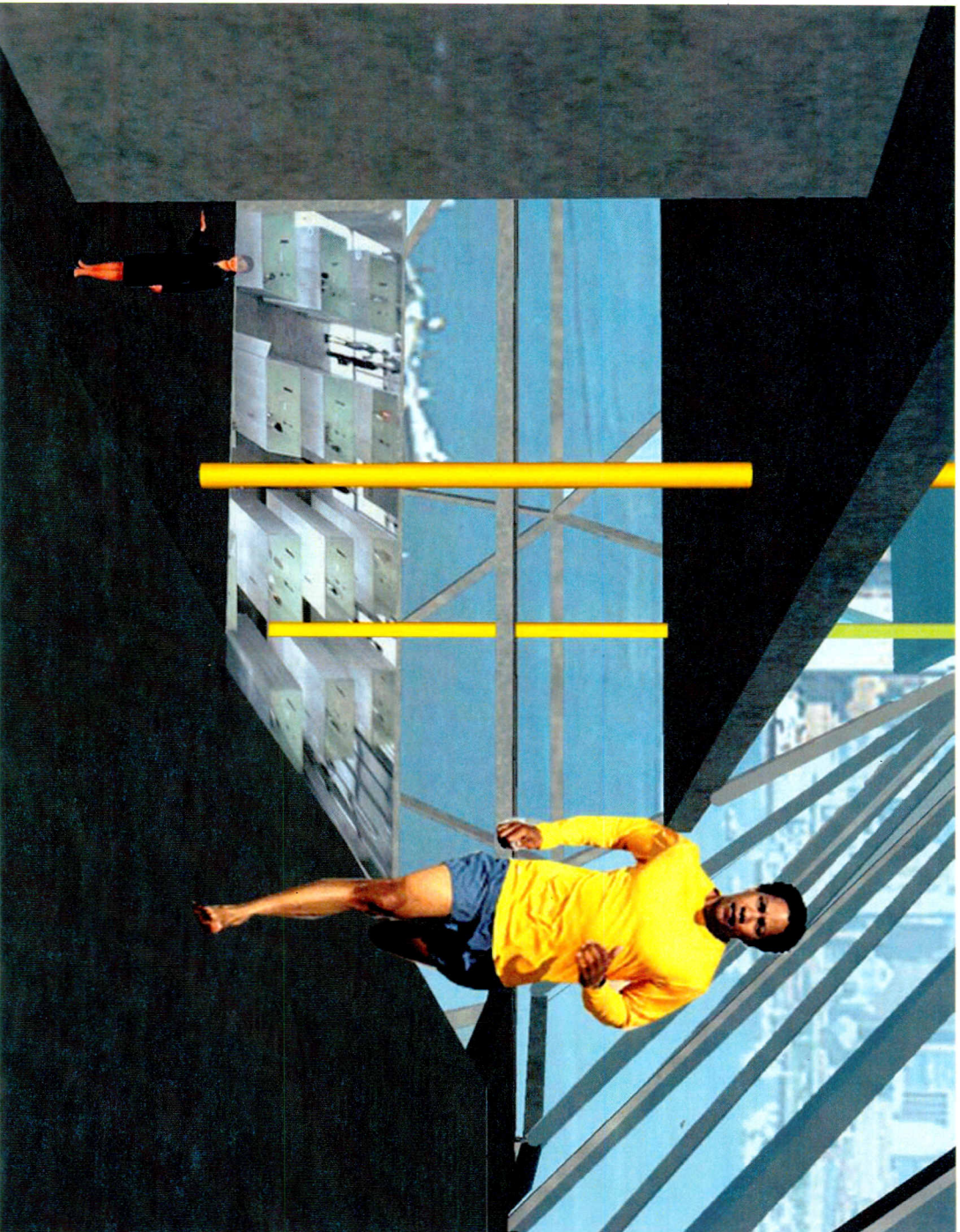
interior perspective





interior perspective

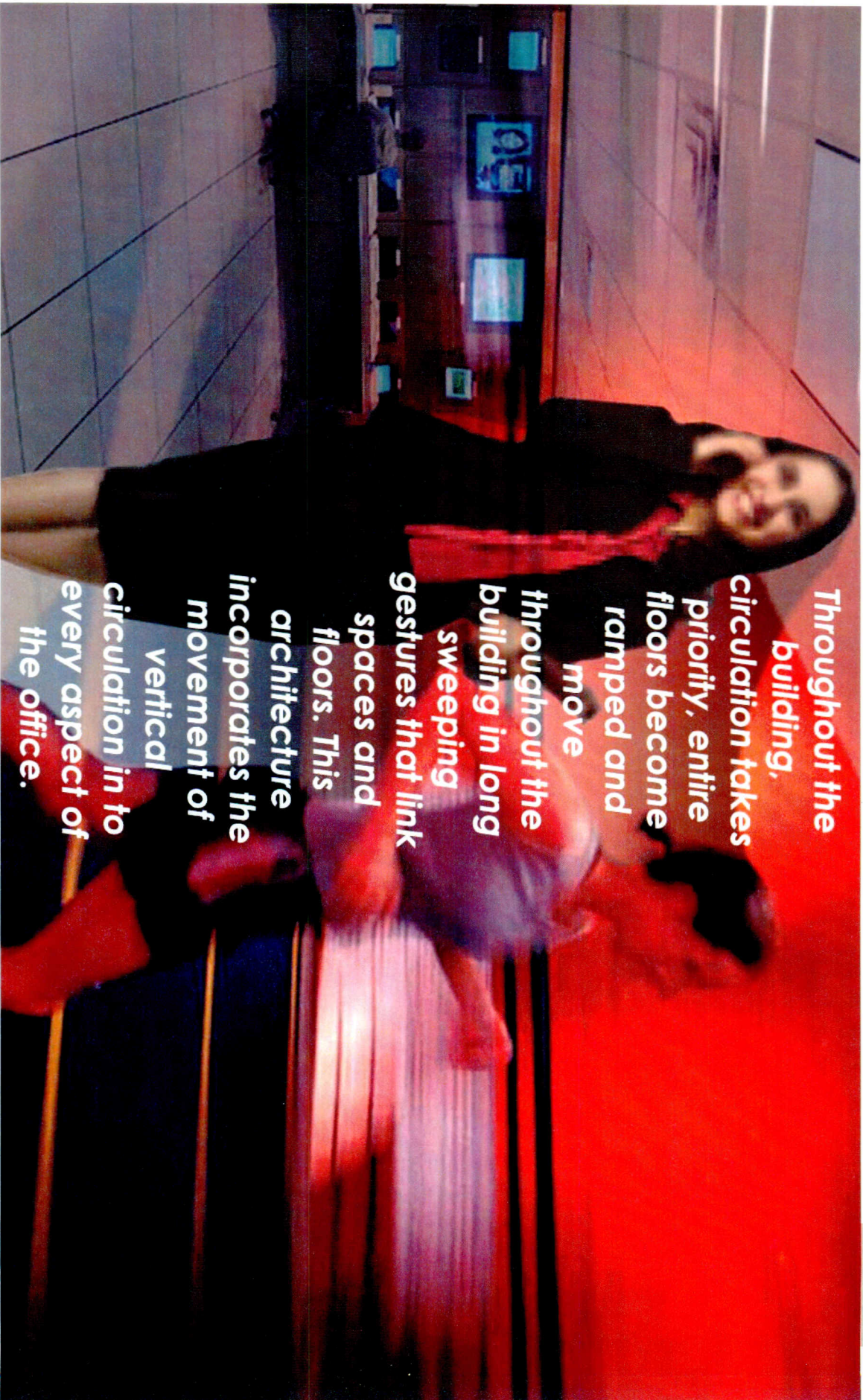




interior perspective



Throughout the building, circulation takes priority, entire floors become ramped and move throughout the building in long sweeping gestures that link spaces and floors. This architecture incorporates the movement of vertical circulation in to every aspect of the office.





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